

Maryland State Retirement and Pension System

Actuarial Valuation Report
As of June 30, 2019



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December 4, 2019

Board of Trustees
Maryland State Retirement and Pension System
120 East Baltimore Street, 16th Floor
Baltimore, MD 21202

Dear Members of the Board:

The results of the **June 30, 2019 annual actuarial valuation** of the Maryland State Retirement and Pension System (“MSRPS”) are presented in this report.

This report was prepared at your request and is intended for use by the Maryland State Retirement Agency (“SRA”) and the Board of Trustees of the MSRPS and those designated or approved by the SRA or the Board. This report may be provided to other parties only in its entirety and only with the permission of the SRA or the Board. GRS is not responsible for unauthorized use of this report.

The purposes of the valuation are as follows:

- Measure the financial position of MSRPS with regard to funding,
- Provide the Board with State and Participating Governmental Unit (“PGU”) contribution rates for certification,
- Determine actuarial and statutory contribution rates with reinvested savings,
- Discuss some of the risks associated with achieving the funding objectives of MSRPS, and
- Analyze the aggregate experience of the State Systems over the past year.

Information required by Statements No. 67 and No. 68 of the Governmental Accounting Standards Board (“GASB”) for fiscal year 2019 is provided in a separate report.

The individual member data required for the valuations was furnished by the SRA, together with pertinent data on financial operations (unaudited). The cooperation and collaboration of SRA staff in furnishing these materials is acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the SRA.

Actuarial valuations are based upon assumptions regarding future activity in specific risk areas including the rates of investment return and payroll growth, eligibility for the various classes of benefits, and longevity among retired lives. The Board adopts these assumptions after considering the advice of the actuary and other professionals.

Each actuarial valuation considers all prior differences between actual and assumed experience in each risk area and adjusts the contribution rates as needed. GRS performed an experience study of MSRPS for the period 2014-2018 after completion of the June 30, 2018 valuations. Assumptions from the experience study including investment return, inflation, COLA increases, mortality rates, retirement rates, withdrawal rates, disability rates, and rates of salary increase were adopted by the Board for first use in the June 30, 2019 valuation. It is our opinion that the actuarial assumptions used for the valuation are reasonable.

The computed contribution rate shown on page I-2 may be considered as a minimum contribution rate that complies with the funding policy stated in the Statutes. Users of this report should be aware that contributions made at that rate do not guarantee benefit security. Given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in this report be considered. This report includes risk metrics on pages II-13 and II-14, but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

The benefit provisions valued in the actuarial valuation as of June 30, 2019 are the same as the provisions from the last actuarial valuation as of June 30, 2018. Portions of the savings from the 2011 pension reforms passed by the General Assembly are to be reinvested as additional contributions into the Systems. Legislation enacted in 2015 reduced the amount of reinvested savings to \$75 million per year beginning in fiscal year 2016 until the combined funded ratio of the Systems reaches 85% at which point the additional contributions cease.

This valuation assumes the continuing ability of the employer to make the contributions necessary to fund this system. A determination regarding whether or not the employer is actually able to do so is outside our scope of expertise. Consequently, we did not perform such an analysis.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. The actuary did not perform an analysis of the potential range of such future measurements in this actuarial valuation report.



This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. We certify that, to the best of our knowledge, this report is complete and accurate and has been prepared in accordance with Maryland's Annotated Code and generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice as promulgated by the Actuarial Standards Board.

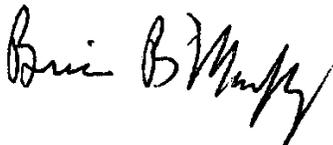
This report should not be relied on for any purpose other than the purposes previously described. Determinations of the financial values associated with benefits described in this report for a purpose other than the intended purpose may produce results that differ significantly from those presented in this report.

The signing actuaries are independent of the plan sponsor.

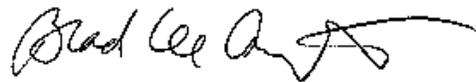
This is one of multiple documents comprising the actuarial report. Other documents comprising the actuarial report include the PowerPoint presentation presented to the Board in November 2019 and separately to the Joint Committee on Pensions in November 2019. Not all of these documents have been issued as of this date.

Brian B. Murphy, Brad L. Armstrong, and Jeffrey T. Tebeau are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD



Brad L. Armstrong, ASA, EA, FCA, MAAA



Jeffrey T. Tebeau, FSA, EA, MAAA

BBM/BLA/JTT:sc

SECTION I

BOARD SUMMARY

Introduction

The funding valuation report presents the results of the June 30, 2019 annual actuarial valuation of the Maryland State Retirement and Pension System (MSRPS). The purposes of the annual funding valuations are as follows:

- Measure the financial position of MSRPS with regard to funding,
- Provide the Board with State and Participating Governmental Unit (“PGU”) contribution rates for certification,
- Determine actuarial and statutory contribution rates with reinvested savings,
- Discuss some of the risks associated with achieving the funding objectives of MSRPS, and
- Analyze the aggregate experience of the State Systems over the past year.

A summary of the primary funding valuation results as of June 30, 2019 is presented on the following page.

The Governmental Accounting Standards Board (GASB) No. 67 and No. 68 valuation report presents the results of the June 30, 2019 annual accounting valuation of the Maryland State Retirement and Pension System (MSRPS). The purpose of the annual accounting valuations is as follows:

- Provide actuarial reporting and disclosure information for the MSRPS and State’s financial report.

The accounting valuation results for the year ended June 30, 2019 are presented in a separate report.

Summary of Valuation Results

June 30, 2019

(\$ in Millions)
(State and Municipal)

	2019						2018		% Change
	TCS	ECS	State			CORS ¹	Total	Total	
			Police	Judges	LEOPS				
A. Demographic Information									
1. Active Number Counts	107,782	81,217	1,364	315	2,683	97	193,458	192,431	0.5%
2. Active Payroll	\$ 7,153	\$ 4,410	\$ 107	\$ 49	\$ 181	\$ 6	\$ 11,905	\$ 11,566	2.9%
3. Retired Number Counts	79,151	80,712	2,505	431	2,053	40	164,892	160,374	2.8%
4. Annual Benefits for Retired Members ²	\$ 2,287	\$ 1,455	\$ 129	\$ 35	\$ 75	\$ 1	\$ 3,982	\$ 3,791	5.0%
5. Deferred / Inactive Number Counts	24,474	25,361	89	8	311	3	50,246	52,301	-3.9%
6. Total Number Counts	211,407	187,290	3,958	754	5,047	140	408,596	405,106	0.9%
B. Assets									
1. Market Value (MV)	\$ 32,803	\$ 18,070	\$ 1,510	\$ 490	\$ 1,045	\$ 26	\$ 53,943	\$ 51,827	4.1%
³ 2. Rate of Return on MV							6.42 %	8.05 %	
3. Actuarial Value (AV)	\$ 33,060	\$ 18,207	\$ 1,522	\$ 494	\$ 1,052	\$ 26	\$ 54,362	\$ 52,587	3.4%
4. Rate of Return on AV							5.67 %	6.83 %	
5. Ratio of AV to MV							100.8%	101.5%	
C. Actuarial Results									
1. Normal Cost as a % of Payroll	11.33%	10.11%	32.99%	37.39%	23.47%	12.46%	11.37%	11.40%	
2. Actuarial Accrued Liability (AAL)									
a. Active	\$ 17,469	\$ 9,169	\$ 507	\$ 170	\$ 545	\$ 12	\$ 27,872	\$ 27,234	2.3%
b. Retired	24,800	16,393	1,780	387	1,044	15	44,420	43,237	2.7%
c. Deferred/Inactive	1,104	1,080	13	3	34	0	2,235	2,105	6.2%
d. Total	\$ 43,372	\$ 26,641	\$ 2,301	\$ 560	\$ 1,623	\$ 28	\$ 74,526	\$ 72,575	2.7%
3. Unfunded AAL (UAAL)	\$ 10,312	\$ 8,434	\$ 779	\$ 66	\$ 571	\$ 2	\$ 20,164	\$ 19,988	0.9%
4. Funded Ratio	76.22 %	68.34 %	66.16 %	88.17 %	64.83 %	92.49 %	72.94 %	72.46 %	
D. Contribution Rates⁴									
	STATE PORTION ONLY								
	FY 2021						FY 2020	FY 2019	
	TCS	ECS	State			Total	Total	Total	
			Police	Judges	LEOPS				
1. Pension Contributions									
a. Employer Normal Cost	4.33%	3.74%	24.99%	30.66%	16.65%	4.61%	4.65%	4.66%	
b. Member Contribution Rate	7.00%	6.74%	8.00%	6.73%	7.00%	6.93%	6.93%	6.93%	
c. UAAL Contribution Rate	<u>10.63%</u>	<u>16.97%</u>	<u>53.10%</u>	<u>9.61%</u>	<u>26.31%</u>	<u>13.14%</u>	<u>13.17%</u>	<u>12.76%</u>	
d. Total	21.96%	27.45%	86.09%	47.00%	49.96%	24.68%	24.75%	24.35%	
2. Total Actuarial Employer Rate (1.a + 1.c)	14.96%	20.71%	78.09%	40.27%	42.96%	17.75%	17.82%	17.42%	
3. Total Employer Budgeted Rate									
a. Employer Budgeted Rate	14.96%	20.71%	78.09%	40.27%	42.96%	17.75%	17.82%	17.42%	
b. Reinvested Savings Rate	<u>0.69%</u>	<u>0.65%</u>	<u>0.94%</u>	<u>0.00%</u>	<u>0.97%</u>	<u>0.71%</u>	<u>0.72%</u>	<u>0.73%</u>	
c. Total Employer Budgeted Rate	15.65%	21.36%	79.03%	40.27%	43.93%	18.46%	18.54%	18.15%	

¹Includes CORS Municipal only. State CORS included in ECS.

²Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019 and July 1, 2018, respectively.

³Actuarial estimation method used is expected to produce results that differ modestly from figures reported by State Street.

⁴Contribution rates shown in the "Total" column are for informational purposes only and are not used for funding purposes. Totals may not add due to rounding.

Actuary's Comments

For the year ended June 30, 2019, the System's assets earned **6.42%** based on our estimate and **6.46%** as reported by State Street (using a slightly different computation method) on a market value basis and **5.67%** on a smoothed or actuarial value basis. The smoothed rate of return is less than the 7.45% assumed rate of investment return. Recognized asset losses from fiscal years 2015, 2016, and 2019 offset recognized asset gains from fiscal years 2017 and 2018 in the actuarial value of assets as of June 30, 2019. This resulted in a loss under the asset smoothing method.

UAAL and Actuarial Gain/(Loss) (\$ in Millions)

	Municipal	State	Total SRPS
Unfunded Actuarial Accrued Liability (UAAL) as of June 30, 2018	\$ 950	\$ 19,038	\$ 19,988
Expected UAAL as of June 30, 2019 before changes	947	18,973	19,920
Changes in methods and assumptions	75	(754)	(679)
Expected UAAL as of June 30, 2019 after changes	1,022	18,219	19,241
Actual UAAL as of June 30, 2019	1,111	19,053	20,164
Net actuarial gain/(loss)	(89)	(834)	(923)
Actuarial gain/(loss) by source			
Actuarial investment experience	(80)	(847)	(927)
Actuarial accrued liability experience	(9)	13	4

Totals may not add due to rounding.

Changes in assumptions included adopting the assumptions pursuant to the 2014-2018 Experience Study.

In relative terms, the overall System funded ratio of actuarial value of assets to liabilities increased from 72.46% in 2018 to **72.94%** this year. If market value of assets were the basis for the measurements, the funded ratio would have increased from 70.00% to 72.38% funded.

The market value of assets exceeds the retiree liabilities by about 21% in total (or 2.8% if accumulated member contributions of about \$8.3 billion are netted out), an increase from 20% last year. This is referred to as a short condition test and is demonstrated in the chart at the bottom of this page. It is looking at the current retiree liabilities as the benefits that will be paid the soonest since these benefits are already in pay status. Active liabilities and deferred vested liabilities do not have associated immediate cash flow requirements. Although the market value of assets exceeds the current retiree liabilities in total, this is not true for one of the smaller systems. For State Police, the market value of assets is less than the retiree liabilities.

(\$ in Millions)

Short Condition Test	TCS	ECS	State Police	Judges	LEOPS	CORS	Total
Market Value of Assets (MVA)	\$ 32,803	\$ 18,070	\$ 1,510	\$ 490	\$ 1,045	\$ 26	\$ 53,943
Retiree Liability	24,800	16,393	1,780	387	1,044	15	44,420
MVA as % of Retiree Liability	132%	110%	85%	127%	100%	165%	121%

Actuary's Comments

In the 2013 legislative session, the Legislature changed the method used to fund the State Systems of the MSRPS. The unfunded liability for each State System is being amortized over a single closed 25-year period beginning July 1, 2014 and ending June 30, 2039 (19 years remaining as of the June 30, 2019 valuation, which determines the fiscal year 2021 contribution). In addition, the corridor method used by the Teachers' Combined System and the State portion of the Employees' Combined System, which was established in 2001, was being phased-out over a 10-year period. In 2015, the Legislature removed the corridor funding method effective with the June 30, 2015 valuation.

The Teachers' Combined System (TCS) remained out of the corridor since the June 30, 2005 valuation and the State portion of the Employees Combined System (ECS) remained out of the corridor since the June 30, 2004 valuation resulting in contribution rates for TCS and ECS that were less than actuarial rates. With the elimination of the corridor effective with the June 30, 2015 valuation report, TCS and ECS began to contribute based on the actuarially determined rate beginning in fiscal year 2017.

Beginning in fiscal year 2012, employers pay a per-member fee to cover the Retirement Agency's operating expenses (i.e., administrative expenses). The State pays the fee for libraries.

In 2011, the General Assembly enacted pension reforms which were effective July 1, 2011, and affected both current actives and new hires. The member contribution rate was increased for members of the Teachers' Pension System and Employees' Pension System from 5% to 7%. The member contribution rate was increased from 4% to 7% for LEOPS. In addition, the benefit attributable to service on or after July 1, 2011 is subject to cost-of-living adjustments (COLAs) that are based on the increase in the Consumer Price Index and capped at 2.5% or 1.0%. The cap is 2.5% if market value investment return from the preceding calendar year was higher or lower than the investment return assumption used in the valuation (currently 7.45%), and 1.0% otherwise. There were also that affected only those members hired on or after July 1, 2011.

In addition to the benefit provision changes, a portion of the savings from the pension reforms is to be reinvested in certain State Systems (TCS, ECS, State Police, and LEOPS). Reinvested savings of \$191 million was contributed in fiscal year 2013. Legislation enacted in 2014 changed the amount of reinvested savings from \$300 million each year beginning in fiscal year 2014 to \$100 million each year for fiscal years 2014 and 2015, \$150 million for fiscal year 2016, \$200 million for fiscal year 2017, \$250 million for fiscal year 2018, \$300 million each year beginning in fiscal year 2019 and thereafter. The \$300 million would then continue until the later of the combined funded ratio of the Systems reaching 85%, and the corridor funding method being fully phased-out. Legislation enacted in 2015 further reduced the amount of reinvested savings to \$75 million per year beginning in fiscal year 2016 until the combined funded ratio of the Systems reaches 85% at which point the reinvestment ceases. The allocation of reinvested savings by System is in proportion to the savings from the pension reforms as measured in the actuarial valuation as of June 30, 2011.

The actuarially determined rates are equal to the employer normal cost plus the Unfunded Actuarial Accrued Liability contribution rate. The unfunded actuarial contribution rate is equal to the payment resulting from amortizing the remaining unfunded liability as a level percentage of pay over a single 25-year closed period beginning July 1, 2014 and ending June 30, 2039 (19 years remaining as of the June 30, 2019 valuation).

Actuary's Comments

The fiscal year 2021 budgeted rates for TCS, ECS, State Police, and LEOPS are equal to the actuarially determined rate. The budgeted rates with reinvested savings are based on a projection of payroll. It is our understanding that the Retirement Agency will monitor contributions to ensure that the System receives the proper amount of reinvested dollar savings during fiscal year 2021. The fiscal year 2021 budgeted rate for Judges is equal to the actuarially determined contribution rate.

Beginning in fiscal year 2013, local employers contributed toward the normal cost for the Teachers Combined System. The required portion of normal cost contribution amounts for local employers for fiscal years 2013 through 2016 was defined by the Maryland statutes. Beginning in fiscal year 2017, local employers contribute the full normal cost contribution on behalf of their employees.

The schedules required under Government Accounting Standards Board (GASB) Statement No. 67 (beginning with fiscal year 2014) and No. 68 (beginning with fiscal year 2015) are provided in a separate report.

Other Observations

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected System Contributions and Funded Status

Given the System's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the System earning 7.40% on the actuarial value of assets), it is expected that:

- (1) The employer normal cost as a percentage of pay will decrease to the level of the Reformed Benefit Plan's (i.e., plans for members hired after July 1, 2011) normal cost as time passes and the active population is comprised entirely of Reformed Plan members,
- (2) The unfunded actuarial accrued liabilities will be fully amortized after 19 years (June 30, 2039), and
- (3) The funded status of the plan will increase gradually towards a 100% funded ratio.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the Actuarial Accrued Liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

- (1) The measurement is inappropriate for assessing the sufficiency of System assets to cover the estimated cost of settling the System's benefit obligations, for example, transferring the liability to an unrelated third party in a free market type transaction.
- (2) The measurement is dependent upon the actuarial cost method which, in combination with the System's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the System would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- (3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Prior Year Asset Experience

ASSETS (STATE AND MUNICIPAL)

Plan assets for this System are measured on both a market value and an actuarial or smoothed value basis. The actuarial smoothing method, described again on page Appendix A-17, annually recognizes 20% of the difference between (a) the expected investment return if the market value of assets had earned the assumed rate of 7.45% during FY 2019, and (b) the actual investment return. Bear in mind that the expected return for this purpose is based on the assumed return from the prior year's actuarial valuation. In addition, there is a market value collar that constrains the actuarial value to be within 20% of the market value of assets. In periods of high returns, this method defers the amount of asset gains above the assumed return (7.45%). Conversely, in periods of returns below the assumed rate, recognition of the losses is deferred. This method limits the effect of temporary asset value fluctuations on contribution rates. The System does not immediately feel the full impact of lower (or higher) costs when asset values fluctuate dramatically.

For the year ended June 30, 2019, the System's assets earned **6.42%** based on our estimate and **6.46%** as reported by State Street (using a slightly different computation method) on a market value basis and **5.67%** on an actuarial value basis. The System experienced an investment loss of **\$530** million on a market value basis and a loss of **\$927** million on an actuarial basis. More detail can be found in Section III. Reconciliations of market value and actuarial value of assets are presented below:

(STATE AND MUNICIPAL)
(\$ in Millions)

	Market Value	Actuarial Value
June 30, 2018 Value	\$ 51,827	\$ 52,586
June 30, 2018 Municipal Withdrawals / New Entrants	-	-
Employer Contributions	2,054	2,054
Member Contributions	807	807
Benefit Payments and Other Disbursements	(4,033)	(4,033)
Expected Investment Earnings (7.45% in FY2019)	3,818	3,875
Expected Value June 30, 2019	\$ 54,473	\$ 55,289
Investment Gain/(Loss)	(530)	(927)
June 30, 2019 Value	\$ 53,943	\$ 54,362

Figures may not add exactly due to rounding

Trends (State and Municipal)

One of the best ways to measure or evaluate the financial condition of a pension plan is to examine the historical trends that are evolving. Below are three charts which illustrate trend information from 1993 through the end of 2019, on the System’s assets and liabilities, annual cash flows in and out of the fund, and the State contribution rate. Our comments on each follow.

Chart A: Assets/Liabilities

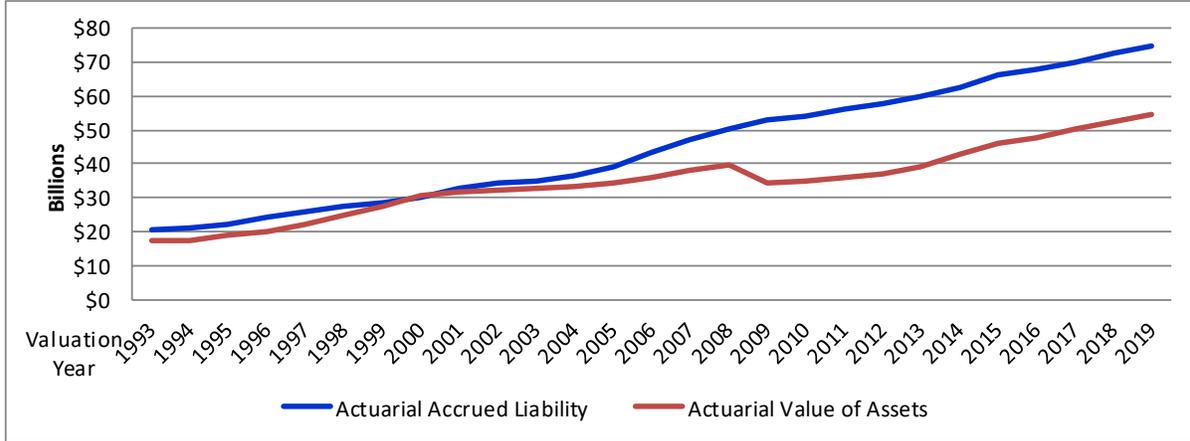


Chart B: Benefits vs. Contributions

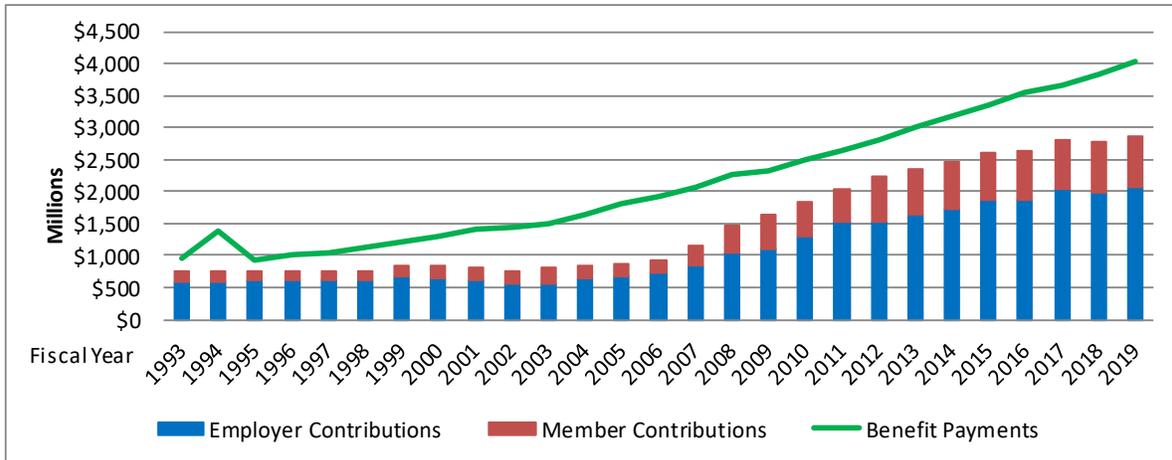
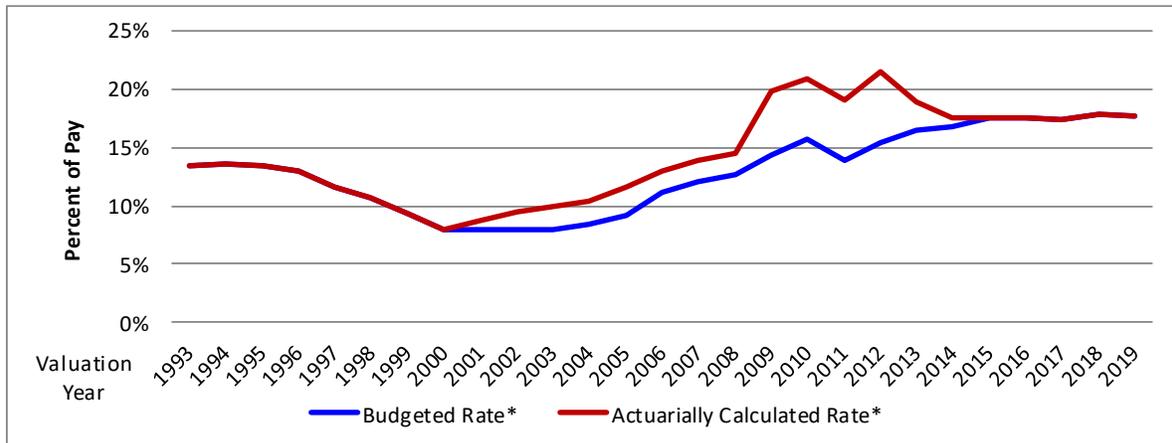


Chart C: State Contribution Rate



* Excludes reinvested savings in valuation years after 2010. 2010 rates are prior to the 2011 GA Reforms.

Trends (State and Municipal)

Chart A displays a comparison of the actuarial value of assets and the Actuarial Accrued Liability (AAL). The difference between the actuarial value of assets and the AAL is the Unfunded Actuarial Accrued Liability. The Unfunded Actuarial Accrued Liability is about \$20 billion as of June 30, 2019, and increased by about \$176 million since the last valuation as of June 30, 2018. As of June 30, 2019, the actuarial value of assets under the five-year asset smoothing method is 101% of the market value of assets, compared with 101% as of June 30, 2018.

Chart B presents non-investment cash flow trend information that can have investment implications. With the aging and retirements of the baby boom generation, MSRPS has seen increases in payments to retirees. This is expected for mature retirement systems such as MSRPS. Benefit payments, which are the total amount below the green line, exceeds the total contributions, which is the total amount below the top of the red bar. The amount needed to pay the excess of benefit payments over total contributions comes from either investment return or liquidation of current assets. If the difference between the total benefit payments and total contributions increases, a larger portion of investment return will be needed to pay benefits and may require a change in asset allocation. The corridor method increased the extent of negative cash flows. The corridor funding method was eliminated first effective with the June 30, 2015 valuation. The budgeted rates have been equal to the actuarial rates since fiscal year 2017.

Finally, Chart C looks at the composite actuarially determined and budgeted State contribution rates. The budgeted contribution rates by System determine the fiscal year State appropriation. It shows the impact of the 1990s sustained investment gains and a continuous lowering of the rate until 2000. Effective with the 2001 valuation, the State appropriations were performed under a corridor funding method for the two largest plans, TCS and ECS. The appropriation remained essentially level for a few years before increasing with the 2004 valuation. Legislation enacted in 2015 removed the corridor funding method for TCS and ECS beginning with the valuation as of June 30, 2015. The budgeted rate is now equal to the actuarial rate for TCS and ECS.

Chart C further illustrates that the corridor method consistently acted to reduce the State's contributions calculated in valuations between 2001 and 2015.

SECTION II

VALUATION RESULTS

State Systems (Excludes Municipalities) Valuation Results

The combined State System's (excluding PGU's) Unfunded Actuarial Accrued Liability increased by \$15 million, from \$19,038 million as of June 30, 2018, to \$19,053 million as of June 30, 2019. There was an expected decrease in the Unfunded Actuarial Accrued Liability of \$65 million, if all actuarial assumptions had been realized. The unfunded liability is expected to decline under the current amortization policy

There was an increase in the Unfunded Actuarial Accrued Liability of \$834 million due to unfavorable plan experience. The net loss due to plan experience of \$834 million is comprised of demographic gains on the liabilities of \$13 million and an asset loss (on the actuarial value of assets) of \$847 million. There was a decrease in the Unfunded Actuarial Accrued Liability of \$753 million due to changes in assumptions.

The combined State System's market value of assets earned 6.42%¹ for the year ended June 30, 2019, which is less than the 7.45% assumed rate of investment return. The actuarial, or smoothed, rate of return measured from this past year was 5.67%, which fell short of the assumed rate of return on the actuarial value of assets, producing an asset loss. Partial recognition of asset gains from FY 2017 and 2018 combined with losses from FY 2015, 2016 and 2019 were recognized in the actuarial value of assets as of June 30, 2019, under the asset smoothing method, resulting in a recognized asset loss of \$847 million. Reconciliations of market value and actuarial value of assets are presented below:

**(STATE Only)
(\$ in Millions)**

	Market Value	Actuarial Value
June 30, 2018 Value	\$ 47,302	\$ 47,997
Employer Contributions	1,928	1,928
Member Contributions	738	738
Benefit Payments and Other Disbursements	(3,749)	(3,749)
Expected Investment Earnings (7.45% in FY2019)	3,484	3,536
Expected Value June 30, 2019	\$ 49,704	\$ 50,451
Investment Gain/(Loss)	(483)	(847)
June 30, 2019 Value	\$ 49,221	\$ 49,604

Figures may not add exactly due to rounding

Liability experience was mixed due to retiree COLA increases. COLA increases of 2.44% were granted to eligible retirees who have a COLA cap of 3.00%, 5.00%, and no COLA cap compared to the actuarial assumptions of 2.23%, 2.58%, and 2.60%, respectively. A COLA increase of 1.0% was granted to benefits with the reformed cap compared to the actuarial assumption 1.46%. All of the State Systems experienced gains on active member liabilities as well, caused mainly by actual increases in salaries that were less than assumed and more non-vested terminations than expected.

¹ The actuarially computed rate of return, excluding municipalities.

State Systems (Excludes Municipalities) Valuation Results

The combined State System funded ratio increased from 71.6% at June 30, 2018 to 72.2% at June 30, 2019.

The actuarially determined contribution rates increased for each System, except Judges, from those calculated in the June 30, 2018 valuation to those calculated in the June 30, 2019 valuation, which determines the FY2020 and FY2021 contributions, respectively.

A reconciliation of the actuarial contribution rate (excluding reinvested savings) is shown below:

	(STATE ONLY)					
	Teachers' Combined System	Employees' Combined System	State Police	Judges	LEOPS	Total
FY 2020 Actuarial Contribution Rate	15.59%	19.56%	79.58%	44.44%	41.37%	17.82%
Change due to Investment Return	0.59%	0.55%	1.90%	1.31%	0.78%	0.60%
Change due to Demographic and Non-Inv. Exp.	-0.10%	0.14%	1.23%	-0.46%	0.64%	-0.01%
Change due to Assumption Changes	-1.02%	0.34%	-2.16%	-5.21%	1.07%	-0.62%
Change due to Total Payroll Experience	0.00%	0.16%	-1.83%	0.01%	-0.70%	0.04%
Change due to Other	<u>-0.10%</u>	<u>-0.04%</u>	<u>-0.63%</u>	<u>0.18%</u>	<u>-0.20%</u>	<u>-0.08%</u>
FY 2021 Actuarial Contribution Rate	14.96%	20.71%	78.09%	40.27%	42.96%	17.75%

Totals may not add due to rounding.

Each System saw an increase in the contribution rates due to unfavorable investment experience. Demographic experience was mixed depending on the System, with TCS and Judges seeing decreases due to liability gains while the other Systems saw increases.

The normal cost rate decreased slightly for most Systems as a result of more active members being covered under the benefit provisions of the reformed benefit plans (before reflecting assumption changes).

In addition, the increase in total payroll was different than expected under the actuarial assumptions (3.10% in FY2019) for all the State Systems. Total payroll increased by 3.1% for TCS, 2.1% for ECS, 6.7% for State Police, 3.0% for Judges and 5.8% for LEOPS. Total payroll growth that was lower than assumed puts upward pressure on the contribution rates because the unfunded liability contribution is spread over a smaller payroll base. The opposite is true when payroll grows more than assumed.

Funded ratios are expected to progress toward 100% at a slightly lower rate than a static amortization schedule of the current unfunded actuarial accrued liabilities as the deferred investment losses from FY2016 and FY2019 are recognized in the actuarial value of assets.

Summary of Valuation Results by System as of June 30, 2019 (State and Municipal)

State Sponsored Plans	Employees				LEOPS	Total State*	
	Teachers	(State)	State Police	Judges	(State)		
Actuarial Liability - Active Members	\$ 17,468,579,756	\$ 7,014,726,912	\$ 507,415,566	\$ 169,766,301	\$ 340,827,989	\$ 25,501,316,524	
Actuarial Liability - Retirees, Term. Vested, & Inactives	<u>25,903,857,488</u>	<u>14,268,371,717</u>	<u>1,793,517,164</u>	<u>390,544,130</u>	<u>798,806,180</u>	<u>43,155,096,679</u>	
Total Actuarial Liability	\$ 43,372,437,244	\$ 21,283,098,629	\$ 2,300,932,730	\$ 560,310,431	\$ 1,139,634,169	\$ 68,656,413,203	
Actuarial Value of Assets	<u>33,060,345,745</u>	<u>13,796,352,071</u>	<u>1,522,238,564</u>	<u>494,038,020</u>	<u>730,534,135</u>	<u>49,603,508,534</u>	
Unfunded Actuarial Accrued Liability (UAAL)	10,312,091,499	7,486,746,558	778,694,166	66,272,411	409,100,034	19,052,904,669	
Funded Ratio	76.22%	64.82%	66.16%	88.17%	64.10%	72.25%	
Active Member Payroll	\$ 7,153,063,434	\$ 3,232,027,368	\$ 106,977,874	\$ 48,934,800	\$ 113,981,595	\$ 10,654,985,071	
UAAL as a Percent-of-Payroll	144.2%	231.6%	727.9%	135.4%	358.9%	178.8%	
<i>Before Reinvested Savings</i>							
Employer Normal Cost Contribution	4.33%	3.74%	24.99%	30.66%	16.65%	4.61%	
UAAL Contribution	<u>10.63%</u>	<u>16.97%</u>	<u>53.10%</u>	<u>9.61%</u>	<u>26.31%</u>	<u>13.14%</u>	
Total Employer Contribution Without Reinvested Savings	14.96%	20.71%	78.09%	40.27%	42.96%	17.75%	
<i>After Reinvested Savings</i>							
Total Employer Contribution Without Reinvested Savings	14.96%	20.71%	78.09%	40.27%	42.96%	17.75%	
Reinvested Savings Rate	<u>0.69%</u>	<u>0.65%</u>	<u>0.94%</u>	<u>0.00%</u>	<u>0.97%</u>	<u>0.71%</u>	
Total Employer Contribution With Reinvested Savings	15.65%	21.36%	79.03%	40.27%	43.93%	18.46%	
Municipal Plans	Employees	LEOPS	CORS	Total Municipal			
	(Municipal)	(Municipal)	(Municipal)				
Actuarial Liability - Active Members	\$ 2,153,831,230	\$ 204,445,814	\$ 12,185,049	\$ 2,370,462,093			
Actuarial Liability - Retirees, Term. Vested, & Inactives	<u>3,204,437,346</u>	<u>279,053,044</u>	<u>15,634,595</u>	<u>3,499,124,985</u>			
Total Actuarial Liability	\$ 5,358,268,576	\$ 483,498,858	\$ 27,819,644	\$ 5,869,587,078			
Actuarial Value of Assets	<u>4,411,058,371</u>	<u>321,670,508</u>	<u>25,731,728</u>	<u>4,758,460,607</u>			
Unfunded Actuarial Accrued Liability (UAAL)	947,210,205	161,828,350	2,087,916	1,111,126,471			
Funded Ratio	82.32%	66.53%	92.49%	81.07%			
Active Member Payroll	\$ 1,177,913,393	\$ 66,981,482	\$ 5,583,279	\$ 1,250,478,154			
UAAL as a Percent-of-Payroll	80.4%	241.6%	37.4%	88.9%			
State and Municipal Sponsored Plans	Teachers	Employees	State Police	Judges	LEOPS	CORS	Total SRPS
Actuarial Liability - Active Members	\$ 17,468,579,756	\$ 9,168,558,142	\$ 507,415,566	\$ 169,766,301	\$ 545,273,803	\$ 12,185,049	\$ 27,871,778,617
Actuarial Liability - Retirees, Term. Vested, & Inactives	<u>25,903,857,488</u>	<u>17,472,809,063</u>	<u>1,793,517,164</u>	<u>390,544,130</u>	<u>1,077,859,224</u>	<u>15,634,595</u>	<u>46,654,221,664</u>
Total Actuarial Liability	\$ 43,372,437,244	\$ 26,641,367,205	\$ 2,300,932,730	\$ 560,310,431	\$ 1,623,133,027	\$ 27,819,644	\$ 74,526,000,281
Actuarial Value of Assets	<u>33,060,345,745</u>	<u>18,207,410,442</u>	<u>1,522,238,564</u>	<u>494,038,020</u>	<u>1,052,204,643</u>	<u>25,731,728</u>	<u>54,361,969,141</u>
Unfunded Actuarial Accrued Liability (UAAL)	10,312,091,499	8,433,956,763	778,694,166	66,272,411	570,928,384	2,087,916	20,164,031,140
Funded Ratio	76.22%	68.34%	66.16%	88.17%	64.83%	92.49%	72.94%
Active Member Payroll	\$ 7,153,063,434	\$ 4,409,940,761	\$ 106,977,874	\$ 48,934,800	\$ 180,963,077	\$ 5,583,279	\$ 11,905,463,225
UAAL as a Percent-of-Payroll	144.2%	191.2%	727.9%	135.4%	315.5%	37.4%	169.4%

* Contribution rates shown in the "Total" column are for informational purposes only and are not used for funding purposes.

Calculation of State Contribution Rates and Illustrated State Contributions (Including Reinvested Savings)

	Teachers	Employees (State)	State Police	Judges	LEOPS (State)	Total State
Percentage of Total Pension Reform Savings*	67.7%	29.4%	1.4%	0.0%	1.5%	100.0%
Reinvested Savings	\$ 50,772,568	\$ 22,019,803	\$ 1,050,207	\$ -	\$ 1,157,423	\$ 75,000,000
FY 2021 Contributions						
Employer Normal Cost Contribution	4.33%	3.74%	24.99%	30.66%	16.65%	4.61%
UAAL Contribution	10.63%	16.97%	53.10%	9.61%	26.31%	13.14%
Total Actuarial Employer Contribution	<u>14.96%</u>	<u>20.71%</u>	<u>78.09%</u>	<u>40.27%</u>	<u>42.96%</u>	<u>17.75%</u>
Total Employer Contribution	14.96%	20.71%	78.09%	40.27%	42.96%	17.75%
Reinvested Saving Rate	<u>0.69%</u>	<u>0.65%</u>	<u>0.94%</u>	<u>0.00%</u>	<u>0.97%</u>	<u>0.71%</u>
Estimated Total Employer Contribution	15.65%	21.36%	79.03%	40.27%	43.93%	18.46%
Projected Payroll	\$ 7,374,808,400	\$ 3,383,475,434	\$ 111,990,700	\$ 51,227,813	\$ 119,322,605	\$ 11,040,824,952
Illustrated Contribution Dollars						
Local Employers' Portion	\$ 293,844,577					\$ 293,844,577
State Portion	809,426,760	\$ 700,717,762	\$ 87,453,538	\$ 20,629,440	\$ 51,260,991	1,669,488,491
Dollar Reinvested Savings	<u>50,772,568</u>	<u>22,019,803</u>	<u>1,050,207</u>	<u>-</u>	<u>1,157,423</u>	<u>75,000,000</u>
Total Illustrated Contribution Dollars	\$ 1,154,043,905	\$ 722,737,565	\$ 88,503,745	\$ 20,629,440	\$ 52,418,414	\$ 2,038,333,068

*Reinvested savings allocated among the State systems based on their proportionate share of the total savings measured as of June 30, 2011. The allocation percentages do not change.

Summary of State Contributions – Including Reinvested Savings (State Portion Only)

		Teachers' Combined	Employees' Combined	State Police	Judges	LEOPS	Total State#
7/1/2019 Valuation Results (FY 2021)	Unfunded Actuarial Liability	\$ 10,312,091,499	\$ 7,486,746,558	\$ 778,694,166	\$ 66,272,411	\$ 409,100,034	\$ 19,052,904,669
	Illustrated Contribution Dollars	\$ 1,154,043,905	\$ 722,737,565	\$ 88,503,745	\$ 20,629,440	\$ 52,418,414	\$ 2,038,333,068
	Local Employers' Portion	293,844,577	NA	NA	NA	NA	\$ 293,844,577
	State Portion	\$ 860,199,328	\$ 722,737,565	\$ 88,503,745	\$ 20,629,440	\$ 52,418,414	\$ 1,744,488,491
	Projected Payroll	\$ 7,374,808,400	\$ 3,383,475,434	\$ 111,990,700	\$ 51,227,813	\$ 119,322,605	\$ 11,040,824,952
	Total Contributions as Percentage of Payroll	15.65%	21.36%	79.03%	40.27%	43.93%	18.46%
7/1/2018 Valuation Results (FY 2020)	Unfunded Actuarial Liability	\$ 10,793,651,534	\$ 6,985,501,886	\$ 782,057,979	\$ 79,740,471	\$ 397,172,509	\$ 19,038,124,378
	Illustrated Contribution Dollars	\$ 1,166,435,154	\$ 670,223,006	\$ 84,629,832	\$ 22,097,277	\$ 47,813,504	\$ 1,991,198,772
	Local Employers' Portion	288,577,069	NA	NA	NA	NA	\$ 288,577,069
	State Portion	\$ 877,858,085	\$ 670,223,006	\$ 84,629,832	\$ 22,097,277	\$ 47,813,504	\$ 1,702,621,703
	Projected Payroll	\$ 7,156,270,596	\$ 3,313,922,305	\$ 105,025,917	\$ 49,723,846	\$ 112,777,570	\$ 10,737,720,234
	Total Contributions as Percentage of Payroll	16.30%	20.22%	80.58%	44.44%	42.40%	18.54%

Contribution rates shown in the "Total" column are for informational purposes only and are not used for funding purposes.

State Budgeted Contribution Rates by System for the Fiscal Years 2004 to 2021 (State Portion Only)

Valuation Date June 30,	Fiscal Year	Teachers' Combined	Employees' Combined	State Police	Judges	LEOPS	Total State*
2019	2021 @	15.65%	21.36%	79.03%	40.27%	43.93%	18.46%
2019	2021 #	14.96%	20.71%	78.09%	40.27%	42.96%	17.75%
2018	2020 @	16.30%	20.22%	80.58%	44.44%	42.40%	18.54%
2018	2020 #	15.59%	19.56%	79.58%	44.44%	41.37%	17.82%
2017	2019 @	16.16%	19.23%	79.41%	44.53%	40.81%	18.15%
2017	2019 #	15.43%	18.58%	78.41%	44.53%	39.78%	17.42%
2016	2018 @	16.45%	19.22%	81.36%	46.45%	40.77%	18.34%
2016	2018 #	15.71%	18.56%	80.29%	46.45%	39.69%	17.60%
2015	2017 @	16.55%	18.93%	82.50%	46.56%	40.72%	18.32%
2015	2017 #	15.79%	18.28%	81.40%	46.56%	39.60%	17.58%
2014	2016 @^	16.49%	17.04%	80.08%	40.70%	40.95%	17.58%
2014	2016 @	17.27%	17.70%	81.24%	40.70%	42.14%	18.32%
2014	2016 #	15.71%	16.38%	78.91%	40.70%	39.77%	16.83%
2013	2015 @^	16.53%	16.45%	84.73%	42.74%	43.10%	17.44%
2013	2015 @	18.64%	18.30%	88.06%	42.74%	46.56%	19.48%
2013	2015 #	15.47%	15.53%	83.06%	42.74%	41.37%	16.41%
2012	2014 @	17.94%	16.84%	71.85%	50.92%	57.72%	18.54%
2012	2014 #	14.71%	14.05%	66.71%	50.92%	52.47%	15.43%
2011	2013 @	15.30%	14.05%	64.57%	61.18%	50.14%	15.80%
2011	2013 #	13.29%	12.29%	61.21%	61.18%	46.81%	13.85%
2010	2012	15.45%	13.40%	61.01%	60.37%	49.26%	15.67%
2009	2011	14.34%	11.69%	57.03%	59.07%	47.67%	14.33%
2008	2010	13.15%	9.93%	30.79%	48.89%	38.63%	12.62%
2007	2009	11.70%	8.73%	20.53%	43.61%	36.99%	11.14%
2006	2008	11.60%	8.86%	15.44%	44.12%	41.74%	11.10%
2005	2007	9.71%	6.83%	13.83%	42.43%	40.60%	9.18%
2004	2006	9.35%	5.76%	8.22%	41.12%	38.47%	8.46%
2003	2005	9.35%	4.73%	0.00%	36.72%	37.73%	7.97%
2002	2004	9.35%	4.73%	7.58%	43.74%	35.13%	7.98%

* Contribution rates shown in the "Total" column are for informational purposes only and are not used for funding purposes.

@ Includes effect of reinvested savings.

Excludes effect of reinvested savings.

^ Reflects the reduction of reinvested savings passed by the General Assembly from \$300 million to \$100 million for FY 2015 and from \$150 million to \$75 million beginning FY 2016.

Detailed Actuarial Information

Teachers' Combined System

	Actuarial Valuation Performed		% Change
	June 30, 2019 (for FY 2021)	June 30, 2018 (for FY 2020)	
A. Demographic Information			
1. Active Number Count	107,782	106,846	0.9%
2. Retired Member and Beneficiary Count	79,151	77,201	2.5%
3. Vested Former Member Count	24,474	25,188	-2.8%
4. Total Number Count	211,407	209,235	1.0%
5. Active Payroll	\$ 7,153,063,434	\$ 6,941,096,601	3.1%
6. Annual Benefits for Retired Members [#]	\$ 2,287,252,060	\$ 2,189,605,461	4.5%
B. Actuarial Results			
1. Present Value of Projected Benefits Attributable to:			
a. Retired and Disabled Members, and Beneficiaries	\$ 24,800,000,941	\$ 24,650,166,960	0.6%
b. Terminated Vested Members and Former Members Due Refunds of Employee Contributions	1,103,856,547	1,035,541,541	6.6%
c. Active Members	25,315,356,005	24,907,138,206	1.6%
d. Total Present Value	\$ 51,219,213,493	\$ 50,592,846,707	1.2%
2. Less Present Value Total Future Normal Costs	7,846,776,249	7,853,284,975	-0.1%
3. Actuarial Accrued Liability (1d – 2)	\$ 43,372,437,244	\$ 42,739,561,732	1.5%
4. Less Actuarial Value of Assets	33,060,345,745	31,945,910,198	3.5%
5. Unfunded Actuarial Accrued Liability (UAAL) (3 - 4)	\$ 10,312,091,499	\$ 10,793,651,534	-4.5%
6. Funded Ratio	76.22%	74.75%	
7. Employer Normal Cost	\$ 319,329,204	\$ 313,444,652	1.9%
8. Total Projected Payroll	\$ 7,374,808,400	\$ 7,156,270,596	3.1%
9. Total Normal Cost Rate	11.33%	11.38%	
10. Employee Contribution Rate	7.00%	7.00%	
11. Employers' [@] Normal Cost Rate	4.33%	4.38%	
12. UAAL Projected to Contribution Period	\$ 10,197,296,733	\$ 10,751,338,524	
13. Amortization Payment	\$ 783,649,581	\$ 802,191,507	
14. UAAL Amortization Rate*	10.63%	11.21%	
15. Total Actuarial Employer Contribution Rate (11 + 14)	14.96%	15.59%	
16. Estimated Employer Rate after Reinvestment of Savings	15.65%	16.30%	

[#] Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019 and July 1, 2018, respectively.

[@] Employers include the State and local Boards of Education.

^{*} Includes the effects of the one-year lag between the valuation date and the beginning of the contribution period.

Detailed Actuarial Information

Employees' Combined System (State)

	Actuarial Valuation Performed		% Change
	June 30, 2019 (for FY 2021)	June 30, 2018 (for FY 2020)	
A. Demographic Information			
1. Active Number Count	56,432	56,663	-0.4%
2. Retired Member and Beneficiary Count	61,972	60,120	3.1%
3. Vested Former Member Count	18,961	20,047	-5.4%
4. Total Number Count	137,365	136,830	0.4%
5. Active Payroll	\$ 3,232,027,368	\$ 3,165,587,514	2.1%
6. Annual Benefits for Retired Members [#]	\$ 1,179,587,395	\$ 1,115,419,793	5.8%
B. Actuarial Results			
1. Present Value of Projected Benefits Attributable to:			
a. Retired and Disabled Members, and Beneficiaries	\$ 13,410,448,332	\$ 12,622,760,393	6.2%
b. Terminated Vested Members and Former Members Due Refunds of Employee Contributions	857,923,385	811,846,746	5.7%
c. Active Members	9,537,761,424	9,454,801,754	0.9%
d. Total Present Value	\$ 23,806,133,141	\$ 22,889,408,893	4.0%
2. Less Present Value Total Future Normal Costs	2,523,034,512	2,493,947,824	1.2%
3. Actuarial Accrued Liability (1d - 2)	\$ 21,283,098,629	\$ 20,395,461,069	4.4%
4. Less Actuarial Value of Assets	13,796,352,071	13,409,959,183	2.9%
5. Unfunded Actuarial Accrued Liability (UAAL) (3 - 4)	\$ 7,486,746,558	\$ 6,985,501,886	7.2%
a. Less Present Value of Special Liability Payments ^{**}	7,025,988	13,315,633	-47.2%
b. State Portion of UAAL (5 - 6)	7,479,720,570	6,972,186,253	7.3%
6. Funded Ratio	64.82%	65.75%	
7. Employer Normal Cost	\$ 122,737,130	\$ 123,749,766	-0.8%
8. Total Projected Payroll	\$ 3,281,741,449	\$ 3,214,279,637	2.1%
9. Total Normal Cost Rate	10.48%	10.59%	
10. Employee Contribution Rate	6.74%	6.74%	
11. Employers [@] Normal Cost Rate	3.74%	3.85%	
12. UAAL Projected to Contribution Period	\$ 7,472,361,856	\$ 6,978,005,705	
13. Amortization Payment	\$ 574,241,722	\$ 520,651,164	
14. UAAL Amortization Rate [*]	16.97%	15.71%	
15. Total Actuarial Employer Contribution Rate (11 + 14)	20.71%	19.56%	
16. Estimated Employer Rate after Reinvestment of Savings	21.36%	20.22%	

^{**} For Municipalities that withdrew prior to 1996, and thus are part of the State pool. Please see page II-9 for additional details.

^{*} Includes the effects of the one-year lag between the valuation date and the beginning of the contribution period.

[#] Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019 and July 1, 2018, respectively.

Special Liability Payments Employees' Combined System (State)

Schedule of Special Payments as of June 30, 2019 for December 2020 Billing
(Unless noted, amounts are amortized over 25 years with payments increasing 5% per year)

LOC Number	Municipal Corporation	Outstanding Balance as of 6/30/2019*	December 2019 Payment	December 2020 Payment	Last Payment Year
7012	Caroline County Roads Board	\$ 25,687	\$ 26,620 **	\$ 0 **	2019
7716	Harford County Liquor Board	10,008	10,372 **	0 **	2019
8006	Montgomery County Public Library	3,622	3,754 **	0 **	2019
8028	Interstate Comm. on Potomac River Basin	4,332	4,489 **	0 **	2019
8031	Bethesda Fire Department	2,106	2,183 **	0 **	2019
8032	Chevy Chase Fire Department	4,313	4,470 **	0 **	2019
8712	Wicomico County Roads Board	4,450	4,612 **	0 **	2019
6529	Health Systems Agency of Western MD	46,202	47,881	0	2019
6611	Anne Arundel County Government	2,283,731	2,366,721	0	2019
6735	Lexington Market Authority	92,824	96,197	0	2019
6740	Univ of MD Medical Systems Corp	373,643	387,221 ***	0 ***	2019
8002	Montgomery County Board of Education	691,778	716,917	0	2019
8011	Montgomery County Government	1,536,761	1,592,606	0	2019
8026	MD Nat. Capital Parks and Planning Comm.	517,794	536,611	0	2019
8128	Washington Suburban Sanitary Commission	1,064,216	1,102,889	0	2019
8325	St. Mary's Nursing Home	121,721	126,144	0	2019
8611	Washington County Commission	90,552	93,843	0	2019
8612	Washington County Roads Board	73,070	75,725	0	2019
8614	Washington County License Commission	549	569	0	2019
8626	Washington County Sanitary District	22,055	22,856	0	2019
8726	Wicomico Co. Dept. Recreation & Parks	56,574	58,630	0	2019
TOTAL		\$ 7,025,988	\$ 7,281,310	\$ 0	

* The outstanding balance is based on the 7.40% valuation interest rate in order to determine what portion of the total unfunded liability is attributable to the State liability and the special payment liability. The special payment liability is based on the present value of the contributions based on the payment schedule established at entry or withdrawal discounted at the current investment return assumption. Actual payoff amounts will be based on the interest rate in effect when the balance was first established.

** Level dollar payments or credits.

*** Dollar payments decrease each year based on a schedule provided by the prior actuary.

Detailed Actuarial Information

State Police

	Actuarial Valuation Performed		
	June 30, 2019 (for FY 2021)	June 30, 2018 (for FY 2020)	% Change
A. Demographic Information			
1. Active Number Count	1,364	1,347	1.3%
2. Retired Member and Beneficiary Count	2,505	2,477	1.1%
3. Vested Former Member Count	89	99	-10.1%
4. Total Number Count	3,958	3,923	0.9%
5. Active Payroll	\$ 106,977,874	\$ 100,324,842	6.6%
6. Annual Benefits for Retired Members [#]	\$ 128,577,798	\$ 123,862,208	3.8%
B. Actuarial Results			
1. Present Value of Projected Benefits Attributable to:			
a. Retired and Disabled Members, and Beneficiaries	\$ 1,780,278,894	\$ 1,775,034,711	0.3%
b. Terminated Vested Members and Former Members Due Refunds of Employee Contributions	13,238,270	15,875,962	-16.6%
c. Active Members	804,310,830	683,010,417	17.8%
d. Total Present Value	\$ 2,597,827,994	\$ 2,473,921,090	5.0%
2. Less Present Value Total Future Normal Costs	296,895,264	223,222,171	33.0%
3. Actuarial Accrued Liability (1d – 2)	\$ 2,300,932,730	\$ 2,250,698,919	2.2%
4. Less Actuarial Value of Assets	1,522,238,564	1,468,640,940	3.6%
5. Unfunded Actuarial Accrued Liability (UAAL) (3 - 4)	\$ 778,694,166	\$ 782,057,979	-0.4%
6. Funded Ratio	66.16%	65.25%	
7. Employer Normal Cost	\$ 27,144,982	\$ 24,489,069	10.8%
8. Total Projected Payroll	\$ 108,623,376	\$ 101,868,009	6.6%
9. Total Normal Cost Rate	32.99%	32.04%	
10. Employee Contribution Rate	8.00%	8.00%	
11. Employers' Normal Cost Rate	24.99%	24.04%	
12. UAAL Projected to Contribution Period	\$ 773,776,809	\$ 781,820,980	
13. Amortization Payment	\$ 59,463,786	\$ 58,334,146	
14. UAAL Amortization Rate*	53.10%	55.54%	
15. Total Actuarial Employer Contribution Rate (11 + 14)	78.09%	79.58%	
16. Estimated Employer Rate after Reinvestment of Savings	79.03%	80.58%	

* Includes the effects of the one-year lag between the valuation date and the beginning of the contribution period.

Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019 and July 1, 2018, respectively.

Detailed Actuarial Information

Judges

	Actuarial Valuation Performed		% Change
	June 30, 2019 (for FY 2021)	June 30, 2018 (for FY 2020)	
A. Demographic Information			
1. Active Number Count	315	316	-0.3%
2. Retired Member and Beneficiary Count	431	421	2.4%
3. Vested Former Member Count	8	9	-11.1%
4. Total Number Count	754	746	1.1%
5. Active Payroll	\$ 48,934,800	\$ 47,498,152	3.0%
6. Annual Benefits for Retired Members [#]	\$ 35,371,231	\$ 33,319,561	6.2%
B. Actuarial Results			
1. Present Value of Projected Benefits Attributable to:			
a. Retired and Disabled Members, and Beneficiaries	\$ 387,332,181	\$ 374,350,823	3.5%
b. Terminated Vested Members and Former Members Due Refunds of Employee Contributions	3,211,949	3,764,605	-14.7%
c. Active Members	290,025,633	294,488,571	-1.5%
d. Total Present Value	\$ 680,569,763	\$ 672,603,999	1.2%
2. Less Present Value Total Future Normal Costs	120,259,332	115,857,569	3.8%
3. Actuarial Accrued Liability (1d – 2)	\$ 560,310,431	\$ 556,746,430	0.6%
4. Less Actuarial Value of Assets	494,038,020	477,005,959	3.6%
5. Unfunded Actuarial Accrued Liability (UAAL) (3 - 4)	\$ 66,272,411	\$ 79,740,471	-16.9%
6. Funded Ratio	88.17%	85.68%	
7. Employer Normal Cost	\$ 15,234,188	\$ 15,669,522	-2.8%
8. Total Projected Payroll	\$ 49,687,500	\$ 48,228,754	3.0%
9. Total Normal Cost Rate	37.39%	39.18%	
10. Employee Contribution Rate	6.73%	6.69%	
11. Employers' Normal Cost Rate	30.66%	32.49%	
12. UAAL Projected to Contribution Period	\$ 64,080,816	\$ 79,661,978	
13. Amortization Payment	\$ 4,924,531	\$ 5,943,833	
14. UAAL Amortization Rate*	9.61%	11.95%	
15. Total Actuarial Employer Contribution Rate (11 + 14)	40.27%	44.44%	

*Includes the effects of the one-year lag between the valuation date and the beginning of the contribution period.

[#]Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019 and July 1, 2018, respectively.

Detailed Actuarial Information LEOPS (State)

	Actuarial Valuation Performed		
	June 30, 2019 (for FY 2021)	June 30, 2018 (for FY 2020)	% Change
A. Demographic Information			
1. Active Number Count	1,615	1,590	1.6%
2. Retired Member and Beneficiary Count	1,583	1,520	4.1%
3. Vested Former Member Count	188	190	-1.1%
4. Total Number Count	3,386	3,300	2.6%
5. Active Payroll	\$ 113,981,595	\$ 107,729,522	5.8%
6. Annual Benefits for Retired Members [#]	\$ 56,691,749	\$ 53,492,348	6.0%
B. Actuarial Results			
1. Present Value of Projected Benefits Attributable to:			
a. Retired and Disabled Members, and Beneficiaries	\$ 776,664,359	\$ 761,837,866	1.9%
b. Terminated Vested Members and Former Members Due Refunds of Employee Contributions	22,141,821	21,133,198	4.8%
c. Active Members	555,675,344	474,926,192	17.0%
d. Total Present Value	\$ 1,354,481,524	\$ 1,257,897,256	7.7%
2. Less Present Value Total Future Normal Costs	214,847,355	165,195,942	30.1%
3. Actuarial Accrued Liability (1d – 2)	\$ 1,139,634,169	\$ 1,092,701,314	4.3%
4. Less Actuarial Value of Assets	730,534,135	695,528,805	5.0%
5. Unfunded Actuarial Accrued Liability (UAAL) (3 - 4)	\$ 409,100,034	\$ 397,172,509	3.0%
6. Funded Ratio	64.10%	63.65%	
7. Employer Normal Cost	\$ 19,269,849	\$ 16,484,558	16.9%
8. Total Projected Payroll	\$ 115,734,826	\$ 109,386,585	5.8%
9. Total Normal Cost Rate	23.65%	22.07%	
10. Employee Contribution Rate	7.00%	7.00%	
11. Employers' Normal Cost Rate	16.65%	15.07%	
12. UAAL Projected to Contribution Period	\$ 408,524,638	\$ 397,543,912	
13. Amortization Payment	\$ 31,394,611	\$ 29,662,014	
14. UAAL Amortization Rate*	26.31%	26.30%	
15. Total Actuarial Employer Contribution Rate (11 + 14)	42.96%	41.37%	
16. Estimated Employer Rate after Reinvestment of Savings	43.93%	42.40%	

*Includes the effects of the one-year lag between the valuation date and the beginning of the contribution period.

[#]Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019 and July 1, 2018, respectively.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the System's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the System's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;
2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. Salary and Payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;
6. Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise, if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

PLAN MATURITY MEASURES

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures for MSRPS include the following. Additional maturity measures are shown on the following pages.

	<u>2019</u>	<u>2018</u>
Ratio of market value of assets to total payroll	4.53	4.48
Ratio of actuarial accrued liability to total payroll	6.26	6.28
Ratio of actives to retirees and beneficiaries	1.17	1.20
Ratio of net cash flow to market value of assets	-2.2%	-2.0%
Approximate modified duration of the actuarial accrued liability	12.18	12.48

RATIO OF MARKET VALUE OF ASSETS TO PAYROLL

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

RATIO OF ACTUARIAL ACCRUED LIABILITY TO PAYROLL

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

RATIO OF ACTIVES TO RETIREES AND BENEFICIARIES

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

RATIO OF NET CASH FLOW TO MARKET VALUE OF ASSETS

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

DURATION OF ACTUARIAL ACCRUED LIABILITY

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

ADDITIONAL RISK ASSESSMENT

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

Risk Measures Summary

State and Municipal

(\$ in Millions)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Market		Market				
	Accrued	Market	Value		Value	Retiree	RetLiab /	AAL /	Assets /
Valuation	Liabilities	Value of	Unfunded	Valuation	Funded	Liabilities	AAL	Payroll	Payroll
Date (6/30)	(AAL)	Assets	AAL	Payroll	Ratio	(RetLiab)	(6)/(1)	(1)/(4)	(2)/(4)
2012	\$ 57,869	\$ 37,179	\$ 20,690	\$ 10,337	64.2%	\$ 32,779	56.6%	559.9%	359.7%
2013	60,060	40,363	19,697	10,478	67.2%	34,498	57.4%	573.2%	385.2%
2014	62,610	45,340	17,270	10,804	72.4%	36,077	57.6%	579.5%	419.7%
2015	66,282	45,790	20,492	11,064	69.1%	38,588	58.2%	599.1%	413.9%
2016	67,782	45,366	22,416	11,156	66.9%	39,785	58.7%	607.6%	406.7%
2017	69,987	48,987	20,999	11,419	70.0%	41,112	58.7%	612.9%	429.0%
2018	72,575	51,827	20,747	11,566	71.4%	43,237	59.6%	627.5%	448.1%
2019	74,526	53,943	20,583	11,905	72.4%	44,420	59.6%	626.0%	453.1%

- (5). The Funded ratio is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.
- (6) and (7). The ratio of Retiree liabilities to total accrued liabilities gives an indication of the maturity of the system. As the ratio increases, cash flow needs increase, and the liquidity needs of the portfolio change. A ratio on the order of 50% indicates a maturing system.
- (8) and (9). The ratios of liabilities and assets to payroll gives an indication of both maturity and volatility. Many systems have ratios between 500% and 700%. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of payroll.

Risk Measures Summary

State and Municipal

(\$ in Millions)

	(10)	(11)	(12)	(13) Non- Investment Cash Flow (NICF)	(14) NICF / Assets (13)/(2)	(15) Market Rate of Return	(16) 5-Year Trailing Average
Valuation Date (6/30)	Portfolio StdDev	Std Dev % of Pay	Unfunded / Payroll				
2012			200.2%	\$ (518)	-1.4%	0.3%	0.7%
2013			188.0%	(661)	-1.6%	10.4%	3.9%
2014			159.9%	(729)	-1.6%	14.3%	11.6%
2015	12.5%	51.7%	185.2%	(748)	-1.6%	2.7%	9.3%
2016	12.0%	48.8%	200.9%	(921)	-2.0%	1.1%	5.6%
2017	13.3%	57.1%	183.9%	(852)	-1.7%	10.0%	7.6%
2018	13.3%	59.6%	179.4%	(1,059)	-2.0%	8.1%	7.1%
2019	12.6%	60.3%	172.9%	(1,172)	-2.2%	6.4%	5.6%

- (10) and (11). The portfolio standard deviation measures the volatility of investment return. When multiplied by the ratio of assets to payroll it gives the effect of a one standard deviation asset move as a percent of payroll. This figure helps users understand the difficulty of dealing with investment volatility and the challenges volatility brings to sustainability. This ratio is likely to increase as the plan approaches full funding.
- (12). The ratio of unfunded liability to payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A ratio above approximately 300% or 400% may indicate difficulty in discharging the unfunded liability within a reasonable time frame.
- (13) and (14). The ratio of Non-Investment Cash Flow to assets is an important measure of sustainability. Negative ratios are common and expected for a maturing system. In the longer term, this ratio should be on the order of approximately -4%. A ratio that is significantly more negative than that for an extended period could be a leading indicator of potential exhaustion of assets.
- (15) and (16). Investment return is probably the largest single risk that most systems face. The year-by-year return and the 5-year geometric average both give an indication of the reasonableness of the system's assumed return. Of course, past performance is not a guarantee of future results. Market rate shown is based on actuarial estimation method and differs modestly from figures reported by State Street.

SECTION III

ASSETS

Assets

Pension plan assets play a key role in the financial operation of the plan and in the decisions the Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact benefit levels, negotiated contributions, and the ultimate security of participants' benefits.

In this section we present detailed information on plan assets including:

- **Disclosure** of plan assets at June 30, 2019 and June 30, 2018;
- Statement of the **changes** in market values during the year;
- Development of the Actuarial Value of Assets; and
- An assessment of **investment performance**.

Disclosure

Market values represent "snapshot" or "cash-out" values which provide the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate. As a result, actuaries have traditionally smoothed market fluctuations when developing long range contribution rates.

Current methods employed by this Fund set the actuarial value equal to the expected adjusted market value plus one-fifth of the difference between the actual market value and the expected adjusted market value. In addition, there is a 20% collar limitation which keeps the actuarial value of assets within the range of 80% to 120% of the market value of assets.

Disclosure of Plan Market Value of Assets (State and Municipal) (\$ in Thousands)

	June 30,	
	2019	2018
Assets:		
Cash & Cash Equivalents	\$ 1,639,447	\$ 1,252,466
<i>Receivables</i>		
Contributions		
Employers	18,968	11,643
Employers - Long Term	12,741	18,120
Members	3,837	7,461
Accrued Investment Income	250,325	151,421
Investment Sales Proceeds	1,670,973	1,006,317
Total Receivables	1,956,844	1,194,962
<i>Investments</i>		
U.S. Government Obligations	6,441,406	6,585,127
Domestic Corporate Obligations	4,765,438	3,472,338
International Obligations	613,496	90,497
Domestic Stocks	9,779,000	9,466,331
International Stocks	9,957,602	10,185,922
Mortgages & Mortgage Related Securities	1,658,341	1,528,439
Alternative Investments	19,297,504	19,245,043
Collateral For Loaned Securities	4,483,334	2,043,411
Total Investments	56,996,121	52,617,108
Total Assets	60,592,412	55,064,536
Liabilities:		
Accounts Payable & Accrued Expenses	63,403	60,407
Investment Commitments Payable	2,102,255	1,133,485
Obligation For Collateral For Loaned Securities	4,483,334	2,043,411
Other Liabilities	-	-
Total Liabilities	6,648,992	3,237,303
Net Assets Held in Trust for Pension Benefits	\$ 53,943,419	\$ 51,827,233

Totals may not add due to rounding.

Changes in Market Values (State and Municipal)

	Teachers	Employees (State)	State Police	Judges	LEOPS (State)		Total State
State Sponsored Plans							
Market Value of Assets as of 6/30/2018	\$ 31,480,451,174	\$ 13,219,575,645	\$ 1,446,548,389	\$ 470,020,361	\$ 685,682,057		\$ 47,302,277,626
Employer Contributions	1,143,585,813	632,477,533	86,172,521	21,736,514	44,526,502		1,928,498,883
Member Contributions	494,697,433	222,968,308	8,578,780	3,176,247	8,244,189		737,664,957
Investment Returns	1,999,258,997	835,722,880	91,778,581	29,689,785	44,345,852		3,000,796,094
Disbursements from the Trust	(2,318,939,112)	(1,213,795,858)	(122,721,720)	(34,604,468)	(58,576,459)		(3,748,637,617)
Net Transfers	3,869,829	(4,829,906)	(28,356)	-	988,433		-
Market Value of Assets as of 6/30/2019	\$ 32,802,924,134.55	\$ 13,692,118,602.56	\$ 1,510,328,193.93	\$ 490,018,439.71	\$ 725,210,572.56		\$ 49,220,599,943
		Employees (Municipal)			LEOPS (Municipal)	CORS (Municipal)	Total Municipal
Municipal Plans							
Market Value of Assets as of 6/30/2018		\$ 4,209,157,598			\$ 291,591,543	\$ 24,205,846	\$ 4,524,954,986
Employer Contributions		104,264,100			20,787,218	541,517	125,592,835
Member Contributions		65,099,655			4,243,667	282,486	69,625,808
Investment Returns		266,659,684			19,208,429	1,544,985	287,413,098
Disbursements from the Trust		(267,444,517)			(16,293,523)	(1,029,527)	(284,767,567)
Net Transfers		-			-	-	-
Market Value of Assets as of 6/30/2019		\$ 4,377,736,520.23			\$ 319,537,333.27	\$ 25,545,307.08	\$ 4,722,819,161
	Teachers	Employees (State & Municipal)	State Police	Judges	LEOPS (State & Municipal)	CORS (Municipal)	Total State & Municipal
State and Municipal Sponsored Plans							
Market Value of Assets as of 6/30/2018	\$ 31,480,451,174	\$ 17,428,733,243	\$ 1,446,548,389	\$ 470,020,361	\$ 977,273,599	\$ 24,205,846	\$ 51,827,232,613
Employer Contributions	1,143,585,813	736,741,633	86,172,521	21,736,514	65,313,720	541,517	2,054,091,718
Member Contributions	494,697,433	288,067,963	8,578,780	3,176,247	12,487,856	282,486	807,290,765
Investment Returns	1,999,258,997	1,102,382,564	91,778,581	29,689,785	63,554,280	1,544,985	3,288,209,192
Disbursements from the Trust	(2,318,939,112)	(1,481,240,375)	(122,721,720)	(34,604,468)	(74,869,982)	(1,029,527)	(4,033,405,184)
Net Transfers	3,869,829	(4,829,906)	(28,356)	-	988,433	-	-
Market Value of Assets as of 6/30/2019	\$ 32,802,924,135	\$ 18,069,855,123	\$ 1,510,328,194	\$ 490,018,440	\$ 1,044,747,906	\$ 25,545,307	\$ 53,943,419,104

Totals may not add due to rounding.

Summary of the Development of the Actuarial Value of Assets

June 30, 2019

	Total State	Total Municipal	Total MSRPS
Beginning of Year:			
(1) Market Value of Assets	\$47,302,277,626	\$4,524,954,987	\$51,827,232,613
(2) Actuarial Value of Assets	47,997,045,085	4,589,490,949	52,586,536,034
End of Year:			
(3) Market Value of Assets	49,220,599,944	4,722,819,160	53,943,419,104
(4) Net of Contributions and Disbursements	(1,082,473,777)	(89,548,924)	(1,172,022,701)
(5) Total Investment Income			
=(3)-(1)-(4)	3,000,796,095	287,413,097	3,288,209,192
(6) Projected Rate of Return	7.45%	7.45%	7.45%
(7) Projected Investment Income			
=(1)x(6)+([1+(6)] ^{.5} -1)x(4)	\$ 3,484,421,799	\$ 333,833,365	\$ 3,818,255,164
(8) Beginning of Year Asset Adjustment	0	0	0
(9) Investment Income in Excess of Projected Income	(483,625,704)	(46,420,268)	(530,045,972)
(10) Excess Investment Income Recognized This Year (5-year recognition)			
(10a) From This Year	(96,725,141)	(9,284,054)	(106,009,195)
(10b) From One Year Ago	48,128,675	4,743,653	52,872,328
(10c) From Two Years Ago	196,865,422	19,114,522	215,979,944
(10d) From Three Years Ago	(534,124,901)	(50,965,240)	(585,090,141)
(10e) From Four Years Ago	(409,628,628)	(38,923,664)	(448,552,292)
(10f) Total Phase-ins	(795,484,573)	(75,314,783)	(870,799,356)
(11) Change in Actuarial Value of Assets =(4)+(7)+(8)+(10f)	1,606,463,449	168,969,658	1,775,433,107
End of Year:			
(3) Market Value of Assets as of 6/30	49,220,599,944	4,722,819,160	53,943,419,104
(12) Preliminary Actuarial Value of Assets = (2)+(11)	49,603,508,534	4,758,460,607	54,361,969,141
(12a) Upper Collar Limit 120% x (3)	59,064,719,934	5,667,382,992	64,732,102,926
(12b) Lower Collar Limit 80% x (3)	39,376,479,955	3,778,255,328	43,154,735,283
(13) Adjustment to Remain within 20% Collar	0	0	0
(14) Final Actuarial Value of Assets as of 6/30	49,603,508,534	4,758,460,607	54,361,969,141
(15) Difference Between Market & Actuarial Values	(382,908,590)	(35,641,447)	(418,550,037)
(16) Actuarial Value Rate of Return	5.67%	5.69%	5.67%
(17) Market Value Rate of Return	6.42%	6.42%	6.42%
(18) Ratio of Actuarial Value to Market Value	101%	101%	101%

Summary of the Development of the Actuarial Value of Assets (State Portion Only)

June 30, 2019

	TCS	ECS	State Police	Judges	LEOPS	Total State
Beginning of Year:						
(1) Market Value of Assets	\$31,480,451,174	\$13,219,575,645	\$ 1,446,548,389	\$470,020,361	\$685,682,057	\$47,302,277,626
(2) Actuarial Value of Assets	31,945,910,198	13,409,959,183	1,468,640,940	477,005,959	695,528,805	47,997,045,085
End of Year:						
(3) Market Value of Assets	32,802,924,135	13,692,118,603	1,510,328,194	490,018,440	725,210,573	49,220,599,944
(4) Net of Contributions and Disbursements	(676,786,036)	(363,179,922)	(27,998,776)	(9,691,706)	(4,817,336)	(1,082,473,777)
(5) Total Investment Income						
= (3)-(1)-(4)	\$ 1,999,258,997	\$835,722,880	\$ 91,778,581	\$ 29,689,785	\$ 44,345,852	\$ 3,000,796,095
(6) Projected Rate of Return	7.45%	7.45%	7.45%	7.45%	7.45%	7.45%
(7) Projected Investment Income						
= (1)x(6)+[(1+(6))^5-1]x(4)	\$ 2,320,536,158	\$ 971,572,931	\$ 106,743,634	\$ 34,661,985	\$ 50,907,091	\$ 3,484,421,799
(8) Beginning of Year Asset Adjustment	0	0	0	0	0	0
(9) Investment Income in Excess of Projected Income	\$(321,277,161)	\$(135,850,051)	\$(14,965,053)	\$(4,972,200)	\$(6,561,239)	\$(483,625,704)
(10) Excess Investment Income Recognized This Year (5-year recognition)						
(10a) From This Year	(64,255,432)	(27,170,010)	(2,993,011)	(994,440)	(1,312,248)	(96,725,141)
(10b) From One Year Ago	31,467,397	14,064,503	1,559,453	466,840	570,482	48,128,675
(10c) From Two Years Ago	130,099,381	56,016,846	5,989,864	1,917,407	2,841,924	196,865,422
(10d) From Three Years Ago	(355,000,835)	(149,780,626)	(16,596,414)	(5,277,155)	(7,469,871)	(534,124,901)
(10e) From Four Years Ago	(271,625,086)	(115,130,834)	(13,107,126)	(4,050,870)	(5,714,712)	(409,628,628)
(10f) Total Phase-ins	(529,314,575)	(222,000,121)	(25,147,234)	(7,938,218)	(11,084,425)	(795,484,573)
(11) Change in Actuarial Value of Assets = (4)+(7)+(8)+(10f)	1,114,435,547	386,392,888	53,597,624	17,032,061	35,005,330	1,606,463,449
End of Year:						
(3) Market Value of Assets as of 6/30	32,802,924,135	13,692,118,603	1,510,328,194	490,018,440	725,210,573	49,220,599,944
(12) Preliminary Actuarial Value of Assets = (2)+(11)	33,060,345,745	13,796,352,071	1,522,238,564	494,038,020	730,534,135	49,603,508,534
(12a) Upper Collar Limit 120% x (3)	39,363,508,961	16,430,542,324	1,812,393,833	588,022,128	870,252,688	59,064,719,934
(12b) Lower Collar Limit 80% x (3)	26,242,339,308	10,953,694,882	1,208,262,555	392,014,752	580,168,458	39,376,479,955
(13) Adjustment to Remain within 20% Collar	0	0	0	0	0	0
(14) Final Actuarial Value of Assets as of 6/30	33,060,345,745	13,796,352,071	1,522,238,564	494,038,020	730,534,135	49,603,508,534
(15) Difference Between Market & Actuarial Values	(257,421,610)	(104,233,468)	(11,910,370)	(4,019,580)	(5,323,562)	(382,908,590)
(16) Actuarial Value Rate of Return	5.67%	5.67%	5.61%	5.66%	5.75%	5.67%
(17) Market Value Rate of Return	6.42%	6.41%	6.41%	6.38%	6.49%	6.42%
(18) Ratio of Actuarial Value to Market Value	101%	101%	101%	101%	101%	101%

Development of the Actuarial Value of Assets Teachers' Combined System

	2018	2019	2020	2021	2022	2023
Beginning of Year:						
(1) Market Value of Assets	\$29,731,190,619	\$31,480,451,174				
(2) Actuarial Value of Assets	30,500,872,500	31,945,910,198				
End of Year:						
(3) Market Value of Assets	31,480,451,174	32,802,924,135				
(4) Net of Contributions and Disbursements	(615,260,562)	(676,786,036)				
(5) Total Investment Income						
=(3)-(1)-(4)	2,364,521,117	1,999,258,997				
(6) Projected Rate of Return	7.50%	7.45%				
(7) Projected Investment Income						
=(1)x(6)+([1+(6)] ⁵ -1)x(4)	2,207,184,130	2,320,536,158				
(8) Beginning of Year Asset Adjustment	0	0				
(9) Investment Income in Excess of Projected Income	157,336,987	(321,277,161)				
(10) Excess Investment Income Recognized This Year (5-year recognition)						
(10a) From This Year	31,467,397	(64,255,432)				
(10b) From One Year Ago	130,099,381	31,467,397	\$ (64,255,432)			
(10c) From Two Years Ago	(355,000,835)	130,099,381	31,467,397	\$ (64,255,432)		
(10d) From Three Years Ago	(271,625,085)	(355,000,835)	130,099,381	31,467,397	\$ (64,255,432)	
(10e) From Four Years Ago	318,173,272	(271,625,086)	(355,000,835)	130,099,379	31,467,399	\$ (64,255,432)
(10f) Total Phase-ins	(146,885,870)	(529,314,575)	(257,689,489)	97,311,344	(32,788,033)	(64,255,432)
(11) Change in Actuarial Value of Assets						
=(4)+(7)+(8)+(10f)	1,445,037,698	1,114,435,547				
End of Year:						
(3) Market Value of Assets	31,480,451,174	32,802,924,135				
(12) Preliminary Actuarial Value of Assets = (2)+(11)	31,945,910,198	33,060,345,745				
(12a) Upper Collar Limit 120% x (3)	37,776,541,409	39,363,508,961				
(12b) Lower Collar Limit 80% x (3)	25,184,360,939	26,242,339,308				
(13) Adjustment to Remain within 20% Collar	0	0				
(14) Final Actuarial Value of Assets as of 6/30	31,945,910,198	33,060,345,745				
(15) Difference Between Market & Actuarial Values	(465,459,024)	(257,421,610)				
(16) Actuarial Value Rate of Return	6.82%	5.67%				
(17) Market Value Rate of Return	8.04%	6.42%				
(18) Ratio of Actuarial Value to Market Value	101%	101%				

Development of the Actuarial Value of Assets Employees' Combined System (State)

	2018	2019	2020	2021	2022	2023
Beginning of Year:						
(1) Market Value of Assets	\$12,529,264,032	\$13,219,575,645				
(2) Actuarial Value of Assets	12,848,684,018	13,409,959,183				
End of Year:						
(3) Market Value of Assets	13,219,575,645	13,692,118,603				
(4) Net of Contributions and Disbursements	(308,351,561)	(363,179,922)				
(5) Total Investment Income						
=(3)-(1)-(4)	998,663,174	835,722,880				
(6) Projected Rate of Return	7.50%	7.45%				
(7) Projected Investment Income						
=(1)x(6)+[(1+(6)) ^{.5} -1]x(4)	928,340,660	971,572,931				
(8) Beginning of Year Asset Adjustment	0	0				
(9) Investment Income in Excess of Projected Income	70,322,514	(135,850,051)				
(10) Excess Investment Income Recognized						
This Year (5-year recognition)						
(10a) From This Year	14,064,503	(27,170,010)				
(10b) From One Year Ago	56,016,846	14,064,503	\$ (27,170,010)			
(10c) From Two Years Ago	(149,780,626)	56,016,846	14,064,503	\$ (27,170,010)		
(10d) From Three Years Ago	(115,130,832)	(149,780,626)	56,016,846	14,064,503	\$ (27,170,010)	
(10e) From Four Years Ago	136,116,175	(115,130,834)	(149,780,625)	56,016,844	14,064,502	\$ (27,170,011)
(10f) Total Phase-ins	(58,713,934)	(222,000,121)	(106,869,286)	42,911,337	(13,105,508)	(27,170,011)
(11) Change in Actuarial Value of Assets						
=(4)+(7)+(8)+(10f)	561,275,165	386,392,888				
End of Year:						
(3) Market Value of Assets	13,219,575,645	13,692,118,603				
(12) Preliminary Actuarial Value of Assets = (2)+(11)	13,409,959,183	13,796,352,071				
(12a) Upper Collar Limit 120% x (3)	15,863,490,774	16,430,542,324				
(12b) Lower Collar Limit 80% x (3)	10,575,660,516	10,953,694,882				
(13) Adjustment to Remain within 20% Collar	0	0				
(14) Final Actuarial Value of Assets as of 6/30	13,409,959,183	13,796,352,071				
(15) Difference Between Market & Actuarial Values	(190,383,538)	(104,233,468)				
(16) Actuarial Value Rate of Return	6.85%	5.67%				
(17) Market Value Rate of Return	8.07%	6.41%				
(18) Ratio of Actuarial Value to Market Value	101%	101%				

Development of the Actuarial Value of Assets State Police

	2018	2019	2020	2021	2022	2023
Beginning of Year:						
(1) Market Value of Assets	\$ 1,371,781,065	\$ 1,446,548,389				
(2) Actuarial Value of Assets	1,408,753,508	1,468,640,940				
End of Year:						
(3) Market Value of Assets	1,446,548,389	1,510,328,194				
(4) Net of Contributions and Disbursements	(34,638,074)	(27,998,776)				
(5) Total Investment Income						
=(3)-(1)-(4)	109,405,399	91,778,581				
(6) Projected Rate of Return	7.50%	7.45%				
(7) Projected Investment Income						
=(1)x(6)+([1+(6)]^5-1)x(4)	101,608,134	106,743,634				
(8) Beginning of Year Asset Adjustment	0	0				
(9) Investment Income in Excess of Projected Income	7,797,265	(14,965,053)				
(10) Excess Investment Income Recognized						
This Year (5-year recognition)						
(10a) From This Year	1,559,453	(2,993,011)				
(10b) From One Year Ago	5,989,864	1,559,453	\$ (2,993,011)			
(10c) From Two Years Ago	(16,596,414)	5,989,864	1,559,453	\$ (2,993,011)		
(10d) From Three Years Ago	(13,107,124)	(16,596,414)	5,989,864	1,559,453	\$ (2,993,011)	
(10e) From Four Years Ago	15,071,593	(13,107,126)	(16,596,413)	5,989,862	1,559,453	\$ (2,993,009)
(10f) Total Phase-ins	(7,082,628)	(25,147,234)	(12,040,107)	4,556,304	(1,433,558)	(2,993,009)
(11) Change in Actuarial Value of Assets						
=(4)+(7)+(8)+(10f)	59,887,432	53,597,624				
End of Year:						
(3) Market Value of Assets	1,446,548,389	1,510,328,194				
(12) Preliminary Actuarial Value of Assets = (2)+(11)	1,468,640,940	1,522,238,564				
(12a) Upper Collar Limit 120% x (3)	1,735,858,067	1,812,393,833				
(12b) Lower Collar Limit 80% x (3)	1,157,238,712	1,208,262,555				
(13) Adjustment to Remain within 20% Collar	0	0				
(14) Final Actuarial Value of Assets as of 6/30	1,468,640,940	1,522,238,564				
(15) Difference Between Market & Actuarial Values	(22,092,551)	(11,910,370)				
(16) Actuarial Value Rate of Return	6.79%	5.61%				
(17) Market Value Rate of Return	8.08%	6.41%				
(18) Ratio of Actuarial Value to Market Value	102%	101%				

Development of the Actuarial Value of Assets Judges

	2018	2019	2020	2021	2022	2023
Beginning of Year:						
(1) Market Value of Assets	\$441,352,187	\$470,020,361				
(2) Actuarial Value of Assets	453,133,735	477,005,959				
End of Year:						
(3) Market Value of Assets	470,020,361	490,018,440				
(4) Net of Contributions and Disbursements	(6,527,100)	(9,691,706)				
(5) Total Investment Income						
= (3)-(1)-(4)	35,195,274	29,689,785				
(6) Projected Rate of Return	7.50%	7.45%				
(7) Projected Investment Income						
= (1)x(6)+([1+(6)] ^{.5-1})x(4)	32,861,073	34,661,985				
(8) Beginning of Year Asset Adjustment	0	0				
(9) Investment Income in Excess of Projected Income	2,334,201	(4,972,200)				
(10) Excess Investment Income Recognized This Year (5-year recognition)						
(10a) From This Year	466,840	(994,440)				
(10b) From One Year Ago	1,917,407	466,840	\$ (994,440)			
(10c) From Two Years Ago	(5,277,155)	1,917,407	466,840	\$ (994,440)		
(10d) From Three Years Ago	(4,050,868)	(5,277,155)	1,917,407	466,840	\$ (994,440)	
(10e) From Four Years Ago	4,482,027	(4,050,870)	(5,277,154)	1,917,407	466,841	\$ (994,441)
(10f) Total Phase-ins	(2,461,749)	(7,938,218)	(3,887,347)	1,389,807	(527,599)	(994,441)
(11) Change in Actuarial Value of Assets = (4)+(7)+(8)+(10f)	23,872,224	17,032,061				
End of Year:						
(3) Market Value of Assets	470,020,361	490,018,440				
(12) Preliminary Actuarial Value of Assets = (2)+(11)	477,005,959	494,038,020				
(12a) Upper Collar Limit 120% x (3)	564,024,433	588,022,128				
(12b) Lower Collar Limit 80% x (3)	376,016,289	392,014,752				
(13) Adjustment to Remain within 20% Collar	0	0				
(14) Final Actuarial Value of Assets as of 6/30	477,005,959	494,038,020				
(15) Difference Between Market & Actuarial Values	(6,985,598)	(4,019,580)				
(16) Actuarial Value Rate of Return	6.76%	5.66%				
(17) Market Value Rate of Return	8.03%	6.38%				
(18) Ratio of Actuarial Value to Market Value	101%	101%				

Development of the Actuarial Value of Assets LEOPS (State)

	2018	2019	2020	2021	2022	2023
Beginning of Year:						
(1) Market Value of Assets	\$640,709,450	\$685,682,057				
(2) Actuarial Value of Assets	657,128,367	695,528,805				
End of Year:						
(3) Market Value of Assets	685,682,057	725,210,573				
(4) Net of Contributions and Disbursements	(5,722,307)	(4,817,336)				
(5) Total Investment Income						
=(3)-(1)-(4)	50,694,914	44,345,852				
(6) Projected Rate of Return	7.50%	7.45%				
(7) Projected Investment Income						
=(1)x(6)+[(1+(6)) ⁿ -1]x(4)	47,842,502	50,907,091				
(8) Beginning of Year Asset Adjustment	0	0				
(9) Investment Income in Excess of Projected Income	2,852,412	(6,561,239)				
(10) Excess Investment Income Recognized						
This Year (5-year recognition)						
(10a) From This Year	570,482	(1,312,248)				
(10b) From One Year Ago	2,841,924	570,482	\$ (1,312,248)			
(10c) From Two Years Ago	(7,469,871)	2,841,924	570,482	\$ (1,312,248)		
(10d) From Three Years Ago	(5,714,713)	(7,469,871)	2,841,924	570,482	\$ (1,312,248)	
(10e) From Four Years Ago	6,052,422	(5,714,712)	(7,469,869)	2,841,925	570,484	\$ (1,312,246)
(10f) Total Phase-ins	(3,719,756)	(11,084,425)	(5,369,711)	2,100,159	(741,764)	(1,312,246)
(11) Change in Actuarial Value of Assets						
=(4)+(7)+(8)+(10f)	38,400,439	35,005,330				
End of Year:						
(3) Market Value of Assets	685,682,057	725,210,573				
(12) Preliminary Actuarial Value of Assets = (2)+(11)	695,528,805	730,534,135				
(12a) Upper Collar Limit 120% x (3)	822,818,468	870,252,688				
(12b) Lower Collar Limit 80% x (3)	548,545,646	580,168,458				
(13) Adjustment to Remain within 20% Collar	0	0				
(14) Final Actuarial Value of Assets as of 6/30	695,528,805	730,534,135				
(15) Difference Between Market & Actuarial Values	(9,846,748)	(5,323,562)				
(16) Actuarial Value Rate of Return	6.74%	5.75%				
(17) Market Value Rate of Return	7.95%	6.49%				
(18) Ratio of Actuarial Value to Market Value	101%	101%				

SECTION IV

**GAIN/LOSS EXPERIENCE ANALYSIS
STATE ONLY**

Gain/(Loss) Experience Analysis

State Only

Comments

Purpose of Gain/Loss Analysis

Regular actuarial valuations provide valuable information about the composite change in unfunded actuarial accrued liabilities – whether or not the liabilities are increasing or decreasing, and by how much. However, valuations do not show the portion of the change attributable to each risk area within the retirement system financial mechanism: the rate of investment income on plan assets; the rates of withdrawal of active members who leave covered employment; the rates of mortality; the rates of disability; the rates of salary increase; and the assumed ages at actual retirement. In an actuarial valuation, assumptions are made as to what these rates will be for the next year and for decades in the future.

The objective of a gain and loss analysis is to determine the portion of the change in unfunded actuarial accrued liabilities attributable to each risk area.

The fact that actual experience differs from assumed experience is to be expected – the future cannot be predicted with precision. Changes in the valuation assumed experience for a risk area should be made when the differences between assumed and actual experience have been observed to be sizeable and persistent. One year's gain/loss analysis may or may not be indicative of *long-term trends, which are the basis of financial assumptions.*

The expected and actual numbers of retirements, disabilities, deaths, and terminations found on pages IV-5 through IV-11 reflect experience over the 12-month period from June 30, **2018** through June 30, **2019**.

Derivation of Experience Gain/(Loss) Year Ended June 30, 2019 State Only (\$ in Millions)

Actual experience will never (except by coincidence) coincide exactly with assumed experience. Gains and losses often offset one another over a period of years, but sizable year-to-year fluctuations are common.

	Fiscal Year Ended June 30,	
	2019	2018
(1) UAAL* at start of year	\$19,038	\$18,854
(2) Normal cost from last valuation	1,235	1,201
(3) Actual contributions	2,666	2,603
(4) Interest accrual: $[(1) \times .0745 + \{(2)-(3)\} \times \{[1.0745^{.5}]-1\}]$	1,366	1,363
(5) Expected UAAL before changes: (1) + (2) - (3) + (4)	18,973	18,815
(6) Change in benefit provisions	0	1
(7) Changes in methods and assumptions	(754)	140
(8) Expected UAAL after changes: (5) + (6) + (7)	18,219	18,956
(9) Actual UAAL at end of year	19,053	19,038
(10) Gain/(loss): (8) - (9)	(834)	(82)
(10a) Portion of gain/(loss) due to Assets	(847)	(305)
(10b) Portion of gain/(loss) due to Liabilities	13	223
(10c) Actuarial accrued liabilities at beginning of year	67,035	64,723
(11) Gain/(loss) as a percent of beginning accrued liabilities	(1.2%)	(0.1%)

* *Unfunded Actuarial Accrued Liability.*
Numbers may not add due to rounding.

Summary of System Experience

Year Ended June 30, 2019

State Only

(\$ in Millions)

	2019	
	Total State	% of AAL
Beginning of Year		
1. Total Actuarial Accrued Liabilities (AAL) #	\$67,035.17	100.0 %
2. Valuation Assets	47,997.05	71.6 %
3. Unfunded Actuarial Accrued Liabilities	\$19,038.12	28.4 %
2019 Experience Gains (Losses)		
4. Gains (losses) in economic risk areas		
a. Pay increases	\$ 115.57	0.2 %
b. Investment return	(847.24)	(1.3)%
c. Total	\$ (731.67)	(1.1)%
5. Gains (losses) from active member decrement experience		
a. Service retirement	\$ (9.52)	0.0 %
b. Disability retirement	30.64	0.0 %
c. Death-in-service	(9.14)	0.0 %
d. Other separations	118.46	0.2 %
e. Total	\$ 130.44	0.2 %
6. Gains (losses) from retiree experience		
a. Mortality	\$ 62.45	0.1 %
b. Benefit related/COLAs	(13.34)	0.0 %
c. Other/unexpected retirees & beneficiaries	(82.41)	(0.1)%
d. Total	\$ (33.30)	0.0 %
7. Gains (losses) from other sources		
a. Actual vs. expected liability for members commencing receipt of benefits	\$ 49.80	0.1 %
b. Deferred members returning to work	(55.48)	(0.1)%
c. Deferred mortality/actual vs. expected liability	(5.62)	0.0 %
d. Data related	(22.25)	0.0 %
e. All other sources	(165.48)	(0.2)%
f. Total	\$ (199.04)	(0.3)%
8. Total experience gains (losses) (4c) + (5e) + (6d) + (7f)	\$ (833.57)	(1.2)%
End of Year		
9. Total Actuarial Accrued Liabilities*	\$69,409.92	100.0 %
10. Valuation Assets	49,603.51	71.5 %
11. Unfunded Actuarial Accrued Liabilities	\$19,806.41	28.5 %

* Prior to reflecting changes in assumptions and benefit provisions.
Totals may not add due to rounding.

Historical Summary of System Experience State Only (\$ in Millions)

Year	Gain (Loss) During the Year Due To								Total Experience
	Service Retirement	Disability Retirement	Survivor Benefits	Other Turnover	Pay Increases	Investment Return	Retiree Experience	Other Sources	
2017	8.2	19.3	(7.0)	115.6	185.8	(254.0)	408.9	(151.6)	325.1
2018	(44.1)	32.1	(12.3)	167.7	341.0	(305.4)	56.8	(318.1)	(82.3)
2019	(9.5)	30.6	(9.1)	118.5	115.6	(847.2)	(33.3)	(199.0)	(833.6)

Active Member Population Development Year Ended June 30, 2019 State Only

	Total State	
	Actual	Expected
Beginning Census	166,762	
- Service Retirement	4,577	5,019
- Death	166	241
- Disability Retirement	295	521
- Other Separations	10,387	7,520
- Transfers Out	74	
+ Transfers In	71	
+ New Entrants	16,174	
Ending Census	167,508	

This page reconciles the active member populations reported in connection with the 2018 and 2019 valuations on an actual and expected basis. Assumptions related to population development are a primary focus of the gain/loss analysis. They generally tend to be more stable than economic assumptions, and therefore, measurements have more meaning.

Assumptions used for the pension valuation were established on a population-weighted basis with the exception of the withdrawal assumptions. Therefore, the expected "Other Separations" presented above for these divisions are based upon liability-weighted assumptions. If population-weighted assumptions were used, the expected numbers would be different and probably closer the actual count than the figure shown.

Salary Increases
for Member Active Both at Beginning and End of Year
During the Year Ended June 30, 2019
State Only

Service Beginning of Year	Number	Salary Increases	
		Actual	Expected
0	596	7.05%	6.68%
1	10,752	6.27%	6.81%
2	9,346	5.76%	5.66%
3	8,127	5.53%	5.31%
4	8,022	5.57%	5.11%
5	7,255	5.24%	5.13%
6	6,418	5.06%	5.14%
7	5,212	4.96%	5.07%
8	4,851	5.49%	5.00%
9	4,538	5.22%	5.09%
Total	65,117		

Age Group	Number	Salary Increases for More than 10 Years of Service	
		Actual	Expected
25-29	53	6.24%	4.53%
30-34	3,422	5.85%	5.01%
35-39	10,275	5.35%	4.87%
40-44	11,859	4.46%	4.62%
45-49	14,322	3.65%	4.36%
50-54	14,785	3.32%	3.86%
55-59	14,560	3.05%	3.50%
60-64	10,998	2.79%	3.10%
65 & Over	5,872	2.62%	3.10%
Total	86,146		

	Total Payroll Growth		
	2019	2018	2017
Actual	2.83%	1.06%	2.30%
Assumed	3.10%	3.15%	3.20%

**Active Members Who Retired with
Retirement Benefits (Unreduced or Reduced)
During the Year Ended June 30, 2019
State Only**

Ages	Male		Female		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 50	68	93	40	38	108	131
50	13	18	14	11	27	29
51	17	17	12	14	29	31
52	22	18	34	25	56	43
53	21	20	43	35	64	55
54	22	18	40	41	62	59
55	33	35	95	73	128	108
56	32	35	84	82	116	117
57	40	29	87	90	127	119
58	39	36	105	92	144	128
59	34	37	106	102	140	139
60	49	49	129	145	178	194
61	61	61	177	176	238	237
62	154	140	493	494	647	634
63	100	105	302	319	402	424
64	74	85	225	260	299	345
65	82	81	277	260	359	341
66	101	88	287	238	388	326
67	72	70	192	176	264	246
68	47	52	137	114	184	166
69	43	38	108	91	151	129
70	45	60	74	76	119	136
71	30	28	68	62	98	90
72	28	25	39	39	67	64
73	12	14	22	24	34	38
74	12	14	31	22	43	36
75 & Over	46	275	59	379	105	654
Totals	1,297	1,541	3,280	3,478	4,577	5,019

Beginning of Year Average for Those Who Retired						
	Male		Female		Total	
Age	62.2	years	63.0	years	62.8	years
Service	26.1	years	25.6	years	25.8	years

**Active Members Who Retired with
Disability Benefits
During the Year Ended June 30, 2019
State Only**

Ages	Male		Female		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 25	0	1	1	0	1	1
25-29	1	4	1	3	2	7
30-34	5	8	4	7	9	15
35-39	3	11	8	13	11	24
40-44	3	15	15	22	18	37
45-49	10	24	23	41	33	65
50-54	20	32	47	69	67	101
55-59	25	35	71	98	96	133
60-64	13	29	33	70	46	99
65-69	4	11	5	20	9	31
70-74	1	3	0	5	1	8
75 and over	1	0	1	0	2	0
Totals	86	173	209	348	295	521

Beginning of Year Average for Those Who Became Disabled						
	Male		Female		Total	
Age	52.9	years	52.8	years	52.8	years
Service	17.3	years	17.9	years	17.7	years

**Active Members Who Left Active Status with a
Deferred Benefit (Payments Beginning at a Later Age)
During the Year Ended June 30, 2019
State Only**

Ages	Male		Female		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 25	0	0	0	0	0	0
25-29	3	3	3	2	6	5
30-34	79	49	237	149	316	198
35-39	135	76	330	195	465	271
40-44	119	71	256	189	375	260
45-49	98	77	361	184	459	261
50-54	94	72	299	161	393	233
55-59	72	21	233	64	305	85
60-64	41	8	106	20	147	28
65-69	14	0	32	0	46	0
70-74	7	0	2	0	9	0
75 and over	2	0	3	0	5	0
Totals	664	377	1,862	964	2,526	1,341

Beginning of Year Average for Those Who Terminated With a Deferred Benefit						
	Male		Female		Total	
Age	45.5	years	45.7	years	45.7	years
Service	12.8	years	11.8	years	12.0	years

**Active Members Who Left Active Status with
No Benefit Payable (Contributions Refunded)
During the Year Ended June 30, 2019
State Only**

Ages	Male		Female		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 25	132	99	272	271	404	370
25-29	506	393	1,372	1,011	1,878	1,404
30-34	477	339	1,073	760	1,550	1,099
35-39	311	236	725	559	1,036	795
40-44	215	171	532	461	747	632
45-49	205	165	474	463	679	628
50-54	190	148	397	380	587	528
55-59	134	108	342	280	476	388
60-64	91	81	187	147	278	228
65-69	59	33	101	49	160	82
70-74	19	11	30	14	49	25
75 and over	9	0	8	0	17	0
Totals	2,348	1,784	5,513	4,395	7,861	6,179

Beginning of Year Average for Those Who Terminated and Refunded						
	Male		Female		Total	
Age	38.5	years	37.9	years	38.1	years
Service	4.1	years	3.8	years	3.9	years

Does not include members that died while in active status.

**Comparison of Actual to Expected Deaths
Among Retired Lives
During the Year Ended June 30, 2019
State Only**

Ages	Male			Female			Total		
	Actual	Expected	Exposure	Actual	Expected	Exposure	Actual	Expected	Exposure
Under 50	6	7	843	3	7	827	9	14	1,670
50-54	11	12	1,246	12	11	1,137	23	23	2,383
55-59	19	24	2,175	26	27	3,153	45	51	5,328
60-64	69	54	4,482	116	81	10,139	185	135	14,621
65-69	143	134	9,159	229	217	22,605	372	351	31,764
70-74	224	214	10,374	303	309	21,828	527	522	32,202
75-79	237	213	6,663	313	319	13,760	550	532	20,423
80-84	255	221	4,026	376	320	8,122	631	542	12,148
85-89	259	216	2,317	446	335	4,935	705	551	7,252
90-94	157	138	885	371	287	2,469	528	425	3,354
95-99	48	39	161	182	144	775	230	183	936
100 & Over	7	6	17	40	32	114	47	38	131
Totals	1,435	1,278	42,348	2,417	2,089	89,864	3,852	3,367	132,212

SECTION V

HISTORICAL GASB No. 25 AND No. 27 INFORMATION

GASB Statements No. 67 and No. 68 are the accounting standards which replaced GASB Statements No. 25 and 27. GASB Statement No. 67 is first effective for fiscal year 2014 and GASB Statement No. 68 is first effective for fiscal year 2015. A separate GASB Statements No. 67 and No. 68 report has been issued outside of this report. This section contains historical GASB Statements No. 25 and No. 27 reporting information for prior fiscal years and illustrative information for fiscal year 2015 and after.

Schedule of Funding Progress (State and Municipal) (\$ in Thousands)

Actuarial Valuation Date June 30,	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Payroll (c)	UAAL as a Percentage of Payroll [(b - a) / c]
2010	\$ 34,688,346	\$ 54,085,081	\$ 19,396,735	64.14%	\$ 10,657,944	182%
2011	36,177,656	55,917,543	19,739,887	64.70%	10,478,800	188%
2012	37,248,401	57,869,145	20,620,745	64.37%	10,336,537	199%
2013	39,350,969	60,060,091	20,709,122	65.52%	10,477,544	198%
2014	42,996,957	62,610,194	19,613,237	68.67%	10,803,632	182%
2015	46,170,624	66,281,781	20,111,157	69.66%	11,063,962	182%
2016	47,803,679	67,781,924	19,978,245	70.53%	11,155,924	179%
2017	50,250,465	69,986,576	19,736,111	71.80%	11,418,973	173%
2018	52,586,536	72,574,689	19,988,153	72.46%	11,566,220	173%
2019	54,361,969	74,526,000	20,164,031	72.94%	11,905,463	169%

The figures for fiscal years prior to 2015 were applicable for both funding and accounting purposes under GASB Statements 25 and 27. The figures shown for fiscal year 2015 and after are applicable for funding purposes only. Accounting figures under GASB Statements 67 and 68 for fiscal year 2015 and after are shown in a separate report.

Schedule of Funding Progress (\$ in Thousands)

Teachers' Combined System

Actuarial Valuation Date June 30,	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Payroll (c)	UAAL as a Percentage of Payroll [(b - a) / c]
2005	\$ 20,801,529	\$ 23,305,198	\$ 2,503,669	89.26%	\$ 4,867,396	51%
2006	21,575,451	25,617,484	4,042,033	84.22%	5,269,185	77%
2007	22,814,760	28,122,575	5,307,815	81.13%	5,709,765	93%
2008	23,784,404	29,868,705	6,084,301	79.63%	6,117,590	99%
2009	20,605,618	31,172,917	10,567,299	66.10%	6,194,734	171%
2010	20,908,149	31,963,421	11,055,272	65.41%	6,254,648	177%
2011	21,868,875	32,985,145	11,116,270	66.30%	6,196,976	179%
2012	22,523,978	34,252,715	11,728,737	65.76%	6,080,603	193%
2013	23,845,618	35,530,441	11,684,823	67.11%	6,185,176	189%
2014	26,067,577	36,882,587	10,815,010	70.68%	6,310,253	171%
2015	27,995,476	38,934,459	10,938,983	71.90%	6,470,706	169%
2016	29,020,809	39,934,125	10,913,316	72.67%	6,611,038	165%
2017	30,500,873	41,198,985	10,698,113	74.03%	6,780,838	158%
2018	31,945,910	42,739,562	10,793,652	74.75%	6,941,097	156%
2019	33,060,346	43,372,437	10,312,091	76.22%	7,153,063	144%

The figures for fiscal years prior to 2015 were applicable for both funding and accounting purposes under GASB Statements 25 and 27. The figures shown for fiscal year 2015 and after are applicable for funding purposes only. Accounting figures under GASB Statements 67 and 68 for fiscal year 2015 and after are shown in a separate report.

Schedule of Funding Progress (\$ in Thousands)

Employees' Combined System (State and Municipal)

Actuarial Valuation Date June 30,	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Payroll (c)	UAAL as a Percentage of Payroll [(b - a) / c]
2005	\$ 11,855,673	\$ 13,671,756	\$ 1,816,083	86.72%	\$ 3,537,602	51%
2006	12,287,942	15,291,091	3,003,149	80.36%	3,793,125	79%
2007	13,026,321	16,385,823	3,359,502	79.50%	4,016,221	84%
2008	13,599,717	17,609,769	4,010,052	77.23%	4,165,013	96%
2009	11,839,115	18,517,486	6,678,371	63.93%	4,249,536	157%
2010	11,937,944	19,009,788	7,071,844	62.80%	4,137,474	171%
2011	12,387,810	19,722,264	7,334,453	62.81%	4,027,810	182%
2012	12,667,592	20,283,028	7,615,436	62.45%	3,998,475	190%
2013	13,326,586	21,046,733	7,720,147	63.32%	4,030,261	192%
2014	14,547,390	22,059,765	7,512,375	65.95%	4,214,981	178%
2015	15,615,327	23,402,850	7,787,524	66.72%	4,300,748	181%
2016	16,130,438	23,817,251	7,686,814	67.73%	4,245,333	181%
2017	16,939,887	24,579,830	7,639,943	68.92%	4,319,053	177%
2018	17,679,888	25,462,497	7,782,609	69.44%	4,301,247	181%
2019	18,207,410	26,641,367	8,433,957	68.34%	4,409,941	191%

The figures for fiscal years prior to 2015 were applicable for both funding and accounting purposes under GASB Statements 25 and 27. The figures shown for fiscal year 2015 and after are applicable for funding purposes only. Accounting figures under GASB Statements 67 and 68 for fiscal year 2015 and after are shown in a separate report.

Schedule of Funding Progress (\$ in Thousands)

State Police

Actuarial Valuation Date June 30,	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Payroll (c)	UAAL as a Percentage of Payroll [(b - a) / c]
2005	\$ 1,289,345	\$ 1,284,950	\$ (4,395)	100.34%	\$ 76,463	-6%
2006	1,301,877	1,325,875	23,998	98.19%	80,649	30%
2007	1,334,375	1,516,935	182,560	87.97%	83,191	219%
2008	1,343,208	1,601,576	258,367	83.87%	86,464	299%
2009	1,119,766	1,710,356	590,591	65.47%	85,586	690%
2010	1,085,281	1,722,564	637,283	63.00%	81,705	780%
2011	1,090,383	1,759,676	669,293	61.96%	75,551	886%
2012	1,134,511	1,826,546	692,035	62.11%	77,690	891%
2013	1,164,217	1,882,501	718,284	61.84%	79,848	900%
2014	1,241,758	1,966,572	724,814	63.14%	85,660	846%
2015	1,314,315	2,103,134	788,819	62.49%	91,050	866%
2016	1,344,163	2,124,786	780,623	63.26%	93,491	835%
2017	1,408,754	2,198,337	789,583	64.08%	100,384	787%
2018	1,468,641	2,250,699	782,058	65.25%	100,325	780%
2019	1,522,239	2,300,933	778,694	66.16%	106,978	728%

The figures for fiscal years prior to 2015 were applicable for both funding and accounting purposes under GASB Statements 25 and 27. The figures shown for fiscal year 2015 and after are applicable for funding purposes only. Accounting figures under GASB Statements 67 and 68 for fiscal year 2015 and after are shown in a separate report.

Schedule of Funding Progress (\$ in Thousands)

Judges

Actuarial Valuation Date June 30,	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Payroll (c)	UAAL as a Percentage of Payroll [(b - a) / c]
2005	\$ 260,125	\$ 328,033	\$ 67,908	79.30%	\$ 33,074	205%
2006	273,679	352,537	78,858	77.63%	35,939	219%
2007	293,052	371,987	78,936	78.78%	37,638	210%
2008	306,716	406,782	100,066	75.40%	37,943	264%
2009	270,870	421,039	150,169	64.33%	40,266	373%
2010	276,643	426,215	149,572	64.91%	39,961	374%
2011	293,801	433,240	139,439	67.81%	38,810	359%
2012	330,154	421,286	91,132	78.37%	39,955	228%
2013	354,900	438,836	83,937	80.87%	40,001	210%
2014	389,072	459,447	70,375	84.68%	42,313	166%
2015	416,547	511,390	94,844	81.45%	44,613	213%
2016	430,563	523,929	93,365	82.18%	44,711	209%
2017	453,134	535,902	82,768	84.56%	46,876	177%
2018	477,006	556,746	79,740	85.68%	47,498	168%
2019	494,038	560,310	66,272	88.17%	48,935	135%

The figures for fiscal years prior to 2015 were applicable for both funding and accounting purposes under GASB Statements 25 and 27. The figures shown for fiscal year 2015 and after are applicable for funding purposes only. Accounting figures under GASB Statements 67 and 68 for fiscal year 2015 and after are shown in a separate report.

Schedule of Funding Progress (\$ in Thousands)

LEOPS (State and Municipal)

Actuarial Valuation Date June 30,	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Payroll (c)	UAAL as a Percentage of Payroll [(b - a) / c]
2005	\$ 310,087	\$ 537,736	\$ 227,648	57.67%	\$ 87,220	261%
2006	352,416	649,826	297,410	54.23%	106,669	279%
2007	414,153	738,549	324,396	56.08%	122,015	266%
2008	465,386	748,005	282,619	62.22%	133,445	212%
2009	441,827	895,099	453,273	49.36%	140,071	324%
2010	471,728	950,236	478,508	49.64%	140,199	341%
2011	526,807	1,002,708	475,900	52.54%	135,177	352%
2012	580,826	1,070,087	489,261	54.28%	135,185	362%
2013	642,678	1,143,154	500,476	56.22%	137,613	364%
2014	732,333	1,222,137	489,804	59.92%	145,673	336%
2015	808,436	1,308,633	500,197	61.78%	151,955	329%
2016	855,997	1,359,432	503,434	62.97%	156,396	322%
2017	924,705	1,449,365	524,660	63.80%	166,561	315%
2018	990,564	1,539,168	548,604	64.36%	170,555	322%
2019	1,052,205	1,623,133	570,928	64.83%	180,963	315%

The figures for fiscal years prior to 2015 were applicable for both funding and accounting purposes under GASB Statements 25 and 27. The figures shown for fiscal year 2015 and after are applicable for funding purposes only. Accounting figures under GASB Statements 67 and 68 for fiscal year 2015 and after are shown in a separate report.

Schedule of Funding Progress (\$ in Thousands)

CORS

Actuarial Valuation Date June 30,	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Payroll (c)	UAAL as a Percentage of Payroll [(b - a) / c]
2010	\$ 8,601	\$ 12,858	\$ 4,257	66.89%	\$ 3,956	108%
2011	9,980	14,511	4,531	68.78%	4,475	101%
2012	11,341	15,483	4,143	73.24%	4,628	90%
2013	16,971	18,426	1,456	92.10%	4,646	31%
2014	18,827	19,685	859	95.64%	4,752	18%
2015	20,523	21,313	790	96.29%	4,890	16%
2016	21,709	22,401	692	96.91%	4,954	14%
2017	23,112	24,157	1,044	95.68%	5,262	20%
2018	24,527	26,017	1,490	94.27%	5,498	27%
2019	25,732	27,820	2,088	92.49%	5,583	37%

The figures for fiscal years prior to 2015 were applicable for both funding and accounting purposes under GASB Statements 25 and 27. The figures shown for fiscal year 2015 and after are applicable for funding purposes only. Accounting figures under GASB Statements 67 and 68 for fiscal year 2015 and after are shown in a separate report.

Schedule of Employer Contributions (State and Municipal)

(\$ in Thousands)

Fiscal Year Ended June 30,	Annual Required Contributions	Actual Contributions	Percentage Contributed
2010	\$ 1,519,980	\$ 1,308,920	86%
2011	2,035,401	1,512,473	74%
2012	2,146,624	1,521,761	71%
2013	2,149,985	1,643,101	76%
2014	2,320,991	1,733,652	75%
2015	2,107,731	1,858,613	88%
2016	1,948,082	1,870,655	96%
2017	2,033,311	2,033,311	100%
2018	1,995,018	1,995,018	100%
2019	2,054,092	2,054,092	100%

The Annual Required Contribution "ARC" was an accounting term defined in GASB Statements 25 and 27 and is no longer applicable for fiscal year 2015 and after. The amounts for fiscal year 2015 and 2016 were calculated in the same manner as the previous years, but are not used under the current accounting standards GASB Statements 67 and 68. For Fiscal Years 2017 and after the employer contribution is based on the actuarially determined contribution as a percent of payroll, therefore, the required and actual contributions are equal.

Schedule of Employer Contributions by System (State and Municipal) (\$ in Thousands)

	Fiscal Year Ended June 30,	Annual Required Contributions	Actual Contributions	Percentage Contributed
Teachers' Combined System	2015	\$ 1,189,318	\$ 1,063,763	89%
	2016	1,112,989	1,084,049	97%
	2017	1,137,472	1,137,472	100%
	2018	1,122,986	1,122,986	100%
	2019	1,143,586	1,143,586	100%
Employees' Combined System	2015	766,239	642,676	84%
	2016	688,920	640,433	93%
	2017	730,028	730,028	100%
	2018	706,693	706,693	100%
	2019	736,742	736,742	100%
State Police	2015	76,057	76,057	100%
	2016	72,320	72,320	100%
	2017	83,000	83,000	100%
	2018	80,241	80,241	100%
	2019	86,173	86,173	100%
Judges	2015	19,028	19,028	100%
	2016	18,384	18,384	100%
	2017	21,861	21,861	100%
	2018	22,465	22,465	100%
	2019	21,737	21,737	100%
LEOPS	2015	56,546	56,546	100%
	2016	54,959	54,959	100%
	2017	60,472	60,472	100%
	2018	62,131	62,131	100%
	2019	65,314	65,314	100%
CORS (Muni)	2015	543	543	100%
	2016	510	510	100%
	2017	478	478	100%
	2018	501	501	100%
	2019	542	542	100%
Total State	2015	1,983,742	1,734,624	87%
	2016	1,837,721	1,760,294	96%
	2017	1,924,203	1,924,203	100%
	2018	1,879,141	1,879,141	100%
	2019	1,928,499	1,928,499	100%
Total Municipal	2015	123,989	123,989	100%
	2016	110,361	110,361	100%
	2017	109,108	109,108	100%
	2018	115,876	115,876	100%
	2019	125,593	125,593	100%

The Annual Required Contribution "ARC" was an accounting term defined in GASB Statements 25 and 27 and is no longer applicable for fiscal year 2015 and after. The amount for fiscal year 2015 and after was calculated in the same manner as the previous years, but is not used under the current accounting standards GASB Statements 67 and 68. For Fiscal Years 2017 and after the employer contribution is based on the actuarially determined contribution as a percent of payroll, therefore, the required and actual contributions are equal.

APPENDIX A



ACTUARIAL ASSUMPTIONS AND METHODS

Brief Summary of Actuarial Assumptions and Methods

Valuation date	June 30, 2019
Contribution Fiscal Year Ended	June 30, 2021
Actuarial cost method	Individual entry age
Amortization method for Unfunded Actuarial Accrued Liabilities (UAAL)	Level percent closed
Amorization period	25-year closed schedule ending June 30, 2039; 19 years remaining
Asset valuation method	5-year smoothed market (max. 120% and min. 80% of market value)
Actuarial assumptions:	
Investment rate of return	7.40%
Inflation	2.60% price; 3.10% wage
Projected salary increases	3.10% - 11.60%
Cost-of-living adjustments	2.19% - 3.10% for service prior to July 1, 2011.* 1.42% - 3.10% for service after June 30, 2011.* <i>* Based on System and provisions. See page A-2 and Appendix C for details.</i>
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2019 valuation pursuant to the 2018 Experience Study for the period July 1, 2014 to June 30, 2018.
Mortality	Various versions of the Pub-2010 Mortality Tables with projected generational mortality improvements based on the MP-2018 fully generational mortality improvement scale. Please see pages A-6 and A-7 for details.

Actuarial Assumptions and Methods

Actuarial assumptions were developed in connection with a study of 2014-2018 experience in the Experience Study report dated August 16, 2019, which includes the rationale for the assumptions. The assumptions were adopted by the Board on August 20, 2019. Actuarial assumptions are based on a combination of future expectations and historical data. Specific assumptions are shown below.

A. ACTUARIAL ASSUMPTIONS

	1. Valuation Interest Rate	2. Annual Rate of Increase in Cost of Living			3. Aggregate Payroll Growth
		Service Before 7/1/11	Service After 7/1/11		
Teachers' Retirement	7.40%	2.60%	2.60%	#	3.10%
Teachers' Pension	7.40%	2.19%	1.42%	***	3.10%
Employees' Retirement					
Regular	7.40%	2.60%	2.60%	#	3.10%
Correctional	7.40%	2.60%	1.42%	***	3.10%
Legislative	7.40%	3.10%	3.10%		3.10%
Employees' Pension	7.40%	2.19%	1.42%	*,***	3.10%
State Police Retirement	7.40%	2.60%	1.42%	***	3.10%
Judges Pension	7.40%	3.10%	3.10%		3.10%
LEOPS	7.40%	2.19%	1.42%	**,***,#	3.10%
CORS Municipal	7.40%	2.60%	1.42%	***	3.10%

* A 2.60% simple rate is applicable for municipal members of these Systems, who do not elect to be covered under the Contributory plan.

** A 2.60% simple rate is applicable for former EPS members.

*** The increase is capped at the lesser of 2.5% and increase in CPI if the most recent calendar year market value rate of return was greater than or equal to the assumed rate (currently 7.45% as approved by the Board of Trustees). The increase is capped at the lesser of 1% and increase in CPI if the market value return was less than the assumed rate of 7.45%.

For groups whose COLA is capped at 5%, a 2.57% COLA was assumed. A 2.60% COLA was assumed for groups with an unlimited COLA, 2.19% is assumed for groups that are capped at 3%.

The valuation interest rate is net of investment expenses. Administrative expenses are assumed to be paid directly by employers external to the plan assets. Price inflation is assumed to be 2.60% and wage inflation (i.e., aggregate payroll growth) is assumed to be 3.10%.

Actuarial Assumptions and Methods

A. ACTUARIAL ASSUMPTIONS

Rates of Salary Increases

Years of Service	Annual Rates of Salary Increases							
	Teachers' Retirement & Pension	Employees' Retirement			Employees' Pension	State Police	Judges	LEOPS
		Regular	Correctional	Legislative*				
0	9.60%	6.85%	8.35%	3.10%	6.85%	11.60%	3.10%	7.35%
1	7.10%	6.60%	7.35%	3.10%	6.60%	10.10%	3.10%	7.35%
2	6.10%	6.10%	3.85%	3.10%	6.10%	9.60%	3.10%	7.10%
3	6.10%	5.35%	3.35%	3.10%	5.35%	9.35%	3.10%	5.60%
4	6.10%	4.85%	3.35%	3.10%	4.85%	6.60%	3.10%	5.60%
5	6.10%	4.60%	3.35%	3.10%	4.60%	6.60%	3.10%	5.60%
6	6.10%	4.60%	3.35%	3.10%	4.60%	6.60%	3.10%	5.60%
7	5.85%	4.60%	3.10%	3.10%	4.60%	6.60%	3.10%	5.60%
8	5.85%	4.60%	3.10%	3.10%	4.60%	6.60%	3.10%	5.60%
9	5.85%	4.35%	3.10%	3.10%	4.35%	6.60%	3.10%	5.60%
10	5.85%	4.35%	3.10%	3.10%	4.35%	6.10%	3.10%	5.60%
11	5.60%	4.35%	3.10%	3.10%	4.35%	6.10%	3.10%	5.60%
12	5.60%	4.35%	3.10%	3.10%	4.35%	6.10%	3.10%	5.60%
13	5.10%	4.35%	3.10%	3.10%	4.35%	6.10%	3.10%	5.60%
14	5.10%	4.10%	3.10%	3.10%	4.10%	6.10%	3.10%	5.60%
15	5.10%	4.10%	3.10%	3.10%	4.10%	6.10%	3.10%	5.60%
16	5.10%	3.60%	3.10%	3.10%	3.60%	6.10%	3.10%	5.60%
17	4.60%	3.60%	3.10%	3.10%	3.60%	6.10%	3.10%	5.60%
18	4.60%	3.60%	3.10%	3.10%	3.60%	6.10%	3.10%	5.60%
19	4.10%	3.60%	3.10%	3.10%	3.60%	6.10%	3.10%	5.60%
20	4.10%	3.60%	3.10%	3.10%	3.60%	5.10%	3.10%	5.10%
21	4.10%	3.60%	3.10%	3.10%	3.60%	5.10%	3.10%	5.10%
22	4.10%	3.60%	3.10%	3.10%	3.60%	5.10%	3.10%	5.10%
23	3.60%	3.60%	3.10%	3.10%	3.60%	5.10%	3.10%	5.10%
24	3.60%	3.60%	3.10%	3.10%	3.60%	5.10%	3.10%	5.10%
25	3.60%	3.60%	3.10%	3.10%	3.60%	5.10%	3.10%	5.10%
26	3.60%	3.60%	3.10%	3.10%	3.60%	5.10%	3.10%	5.10%
27	3.60%	3.60%	3.10%	3.10%	3.60%	5.10%	3.10%	5.10%
28	3.10%	3.60%	3.10%	3.10%	3.60%	5.10%	3.10%	5.10%
29	3.10%	3.60%	3.10%	3.10%	3.60%	5.10%	3.10%	5.10%
30+	3.10%	3.10%	3.10%	3.10%	3.10%	3.60%	3.10%	3.60%

CORS Municipal assumptions were the same as shown for Employees' Retirement Correctional.

* Total increase is scheduled to be 0.0% through 2022 and wage inflation after.

Actuarial Assumptions and Methods

A. ACTUARIAL ASSUMPTIONS

Rates of Withdrawal

Sample Ages	Years of Service	Annual Rates of Withdrawal from Active Service													
		Teachers' Retirement & Pension		Employees' Retirement					Employees' Pension		State Police		Judges	LEOPS	
		Male	Female	Regular		Correctional		Legislative	Male	Female	Male	Female		Male	Female
				Male	Female	Male	Female								
All	0	19.00%	16.00%	19.00%	19.00%	14.00%	14.00%	*	19.00%	19.00%	14.00%	14.00%	0.00%	14.00%	14.00%
	1	14.50%	10.50%	14.50%	15.00%	10.00%	14.00%	*	14.50%	15.00%	8.50%	8.50%	0.00%	9.50%	9.50%
	2	12.00%	10.50%	12.00%	12.50%	8.00%	12.00%	*	12.00%	12.50%	6.00%	6.00%	0.00%	8.00%	8.00%
	3	10.00%	9.00%	10.50%	11.00%	7.50%	10.00%	*	10.50%	11.00%	4.25%	4.25%	0.00%	8.00%	8.00%
	4	7.50%	7.75%	9.00%	9.50%	7.00%	10.00%	*	9.00%	9.50%	4.00%	4.00%	0.00%	6.50%	6.50%
	5	7.00%	6.50%	7.25%	7.00%	5.50%	8.50%	*	7.25%	7.00%	3.00%	3.00%	0.00%	5.00%	5.00%
	6	6.25%	5.75%	6.50%	7.00%	5.00%	8.50%	*	6.50%	7.00%	2.50%	2.50%	0.00%	4.50%	4.50%
	7	5.00%	4.75%	6.00%	6.00%	4.00%	6.00%	*	6.00%	6.00%	2.00%	2.00%	0.00%	3.75%	3.75%
	8	4.00%	4.00%	5.50%	5.50%	3.50%	6.00%	*	5.50%	5.50%	2.00%	2.00%	0.00%	3.50%	3.50%
	9	3.50%	3.50%	4.50%	4.50%	3.50%	5.00%	*	4.50%	4.50%	1.50%	1.50%	0.00%	3.50%	3.50%
25	10	4.00%	3.50%	4.50%	4.50%	3.50%	5.00%	*	4.50%	4.50%	1.00%	1.00%	0.00%	3.50%	3.50%
30	& Over	2.50%	3.00%	4.00%	4.50%	3.00%	4.00%	*	4.00%	4.50%	1.00%	1.00%	0.00%	2.10%	2.10%
35		2.00%	2.25%	3.50%	3.75%	2.00%	3.50%	*	3.50%	3.75%	1.00%	1.00%	0.00%	1.90%	1.90%
40		1.50%	1.50%	3.00%	3.00%	2.00%	3.25%	*	3.00%	3.00%	1.00%	1.00%	0.00%	1.75%	1.75%
45		1.50%	1.50%	3.00%	2.75%	2.00%	3.25%	*	3.00%	2.75%	1.00%	1.00%	0.00%	1.00%	1.00%
50		1.50%	1.50%	2.50%	2.50%	2.00%	3.25%	*	2.50%	2.50%	1.00%	1.00%	0.00%	1.00%	1.00%
55		3.00%	3.00%	5.00%	5.00%	2.00%	3.25%	*	5.00%	5.00%	1.00%	1.00%	0.00%	1.00%	1.00%
60		3.00%	3.00%	5.00%	5.00%	2.00%	3.25%	*	5.00%	5.00%	1.00%	1.00%	0.00%	1.00%	1.00%
65		3.00%	3.00%	5.00%	5.00%	2.00%	3.25%	*	5.00%	5.00%	1.00%	1.00%	0.00%	1.00%	1.00%

CORS Municipal assumptions were the same as shown for Employees' Retirement Correctional.

* 20% of legislative members are assumed to withdraw after 8 years and each fourth year thereafter.

For active members of the Teachers Retirement and Pension Systems and Employees' Retirement (Regular) and Pension Systems, the probability of electing a refund upon withdrawal (if eligible for a vested benefit) is 15% upon first becoming vested, grading down to 0% upon reaching first eligibility for retirement. Active members that terminate from the other Systems that are eligible for a deferred vested benefit are assumed to leave their contributions in the plan and 100% are assumed to elect a deferred benefit.

Actuarial Assumptions and Methods

A. ACTUARIAL ASSUMPTIONS

Summary of Mortality Assumptions

Group	Status and Gender	Base Mortality Table	Scale / Multiplier	Set Forward	Projection Base Year	Projection Scale
TCS	Healthy Male Retirees	PubT-2010 Male Healthy Retiree	105%	0	2010	MP-2018
	Healthy Female Retirees	PubT-2010 Female Healthy Retiree	110%	0	2010	MP-2018
	Disabled Male Retirees	PubT-2010 Male Disabled Retiree	105%	0	2010	MP-2018
	Disabled Female Retirees	PubT-2010 Female Disabled Retiree	113%	0	2010	MP-2018
	Active Males	PubT-2010 Male Employee	100%	0	2010	MP-2018
	Active Females	PubT-2010 Female Employee	100%	0	2010	MP-2018
ECS (excluding CORS)	Healthy Male Retirees	PubG-2010 Male Healthy Retiree	111%	0	2010	MP-2018
	Healthy Female Retirees	PubG-2010 Female Healthy Retiree	109%	0	2010	MP-2018
	Disabled Male Retirees	PubG-2010 Male Disabled Retiree	134%	0	2010	MP-2018
	Disabled Female Retirees	PubG-2010 Female Disabled Retiree	99%	0	2010	MP-2018
	Active Males	PubG-2010 Male Employee	100%	0	2010	MP-2018
	Active Females	PubG-2010 Female Employee	100%	0	2010	MP-2018
Judges	Healthy Male Retirees	PubG-2010 Male Above Median Healthy Retiree	97%	0	2010	MP-2018
	Healthy Female Retirees	PubG-2010 Female Above Median Healthy Retiree	99%	0	2010	MP-2018
	Disabled Male Retirees	PubG-2010 Male Above Median Healthy Retiree	97%	0	2010	MP-2018
	Disabled Female Retirees	PubG-2010 Female Above Median Healthy Retiree	99%	0	2010	MP-2018
	Active Males	PubG-2010 Male Above Median Employee	100%	0	2010	MP-2018
	Active Females	PubG-2010 Female Above Median Employee	100%	0	2010	MP-2018
State Police, LEOPS, and CORS	Healthy Male Retirees	PubS-2010 Male Healthy Retiree	108%	0	2010	MP-2018
	Healthy Female Retirees	PubS-2010 Female Healthy Retiree	103%	0	2010	MP-2018
	Disabled Male Retirees	PubS-2010 Male Disabled Retiree	122%	0	2010	MP-2018
	Disabled Female Retirees	PubS-2010 Female Disabled Retiree	121%	0	2010	MP-2018
	Active Males	PubS-2010 Male Employee	100%	0	2010	MP-2018
	Active Females	PubS-2010 Female Employee	100%	0	2010	MP-2018

Actuarial Assumptions and Methods

A. ACTUARIAL ASSUMPTIONS

Healthy Retired Mortality

Sample Ages in 2019	Actuarial Present Value of \$1 Monthly for Life (Without COLA)											
	Teachers' Retirement & Pension		Employees' Retirement & Pension		Employees' Retirement Correctional & Legislative		State Police		Judges		LEOPS	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
50	\$151.82	\$153.81	\$146.69	\$151.13	\$148.14	\$150.82	\$148.14	\$150.82	\$149.48	\$152.40	\$148.14	\$150.82
55	145.51	148.18	139.74	145.40	140.82	144.29	140.82	144.29	143.22	146.99	140.82	144.29
60	137.42	141.09	131.08	137.80	131.46	135.98	131.46	135.98	135.28	139.78	131.46	135.98
65	127.11	131.86	120.37	128.01	120.05	125.88	120.05	125.88	125.29	130.44	120.05	125.88
70	114.08	119.86	107.10	115.79	106.33	113.69	106.33	113.69	112.71	118.70	106.33	113.69
75	98.26	104.83	91.35	100.91	90.29	99.19	90.29	99.19	97.52	104.28	90.29	99.19
80	80.43	87.36	73.99	83.79	72.84	82.90	72.84	82.90	80.40	87.49	72.84	82.90

Sample Ages in 2019	Future Life Expectancy (Years)											
	Teachers' Retirement & Pension		Employees' Retirement & Pension		Employees' Retirement Correctional & Legislative		State Police		Judges		LEOPS	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
50	37.61	39.59	34.57	37.88	34.91	37.47	34.91	37.47	36.69	39.05	34.91	37.47
55	32.46	34.42	29.70	32.90	29.84	32.34	29.84	32.34	31.72	34.02	29.84	32.34
60	27.49	29.43	25.03	28.02	24.98	27.40	24.98	27.40	26.94	29.09	24.98	27.40
65	22.72	24.60	20.60	23.32	20.42	22.77	20.42	22.77	22.36	24.33	20.42	22.77
70	18.20	19.95	16.42	18.86	16.19	18.44	16.19	18.44	18.00	19.80	16.19	18.44
75	14.00	15.56	12.56	14.69	12.33	14.43	12.33	14.43	13.95	15.55	12.33	14.43
80	10.28	11.59	9.18	10.95	8.98	10.87	8.98	10.87	10.35	11.69	8.98	10.87

CORS Municipal assumptions were the same as shown for Employees' Retirement Correctional.

Actuarial Assumptions and Methods

A. ACTUARIAL ASSUMPTIONS

Disabled Retired Mortality

Sample Ages in 2019	Actuarial Present Value of \$1 Monthly for Life (Without COLA)											
	Teachers' Retirement & Pension		Employees' Retirement & Pension		Employees' Retirement Correctional & Legislative		State Police		Judges		LEOPS	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
50	\$124.47	\$128.16	\$117.02	\$131.31	\$143.01	\$145.41	\$143.01	\$145.41	\$149.13	\$152.30	\$143.01	\$145.41
55	116.98	122.09	108.86	125.50	135.05	138.21	135.05	138.21	142.78	146.86	135.05	138.21
60	109.70	115.64	101.22	119.22	125.13	129.62	125.13	129.62	134.74	139.62	125.13	129.62
65	101.92	108.05	93.28	111.78	113.62	119.79	113.62	119.79	124.64	130.25	113.62	119.79
70	92.63	98.05	83.96	101.95	100.18	108.20	100.18	108.20	111.94	118.47	100.18	108.20
75	81.10	85.40	72.46	89.48	84.45	94.23	84.45	94.23	96.64	104.01	84.45	94.23
80	67.96	71.24	59.53	75.41	68.01	77.87	68.01	77.87	79.46	87.19	68.01	77.87

Sample Ages in 2019	Future Life Expectancy (Years)											
	Teachers' Retirement & Pension		Employees' Retirement & Pension		Employees' Retirement Correctional & Legislative		State Police		Judges		LEOPS	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
50	25.54	27.47	22.30	29.10	32.15	34.41	32.15	34.41	36.39	38.95	32.15	34.41
55	22.07	24.04	19.12	25.53	27.36	29.58	27.36	29.58	31.43	33.93	27.36	29.58
60	19.03	20.86	16.40	22.20	22.79	25.03	22.79	25.03	26.66	29.00	22.79	25.03
65	16.22	17.80	13.93	18.98	18.60	20.84	18.60	20.84	22.10	24.25	18.60	20.84
70	13.50	14.70	11.53	15.74	14.74	16.94	14.74	16.94	17.77	19.72	14.74	16.94
75	10.81	11.65	9.14	12.56	11.20	13.27	11.20	13.27	13.74	15.48	11.20	13.27
80	8.31	8.88	6.91	9.66	8.18	9.89	8.18	9.89	10.17	11.63	8.18	9.89

CORS Municipal assumptions were the same as shown for Employees' Retirement Correctional.

Actuarial Assumptions and Methods

ACTUARIAL ASSUMPTIONS

Accidental Death Mortality Rates		
State Police and LEOPS		
Sample Ages in 2019	Male	Female
20	0.0120%	0.0050%
25	0.0122%	0.0068%
30	0.0153%	0.0099%
35	0.0180%	0.0134%
40	0.0202%	0.0162%
45	0.0238%	0.0194%
50	0.0331%	0.0263%
55	0.0512%	0.0388%
60	0.0822%	0.0531%
65	0.1245%	0.0657%
70	0.2168%	0.1239%
75	0.3933%	0.2487%
80	0.7358%	0.5074%

Additional margin for future mortality improvements are included in the projection scale.

Actuarial Assumptions and Methods

A. ACTUARIAL ASSUMPTIONS

Rates of Disability

Sample Ages	Annual Rates of Disability															
	Teachers' Retirement				Teachers' Pension				Employees' Retirement							
	Ordinary		Accidental		Ordinary		Accidental		Ordinary				Accidental			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
25	0.0252%	0.0352%	0.0015%	0.0016%	0.0252%	0.0352%	0.0015%	0.0016%	0.1131%	0.0703%	0.0817%	0.1040%	0.0360%	0.0172%	0.0595%	0.0780%
30	0.0252%	0.0352%	0.0015%	0.0016%	0.0252%	0.0352%	0.0015%	0.0016%	0.1450%	0.0695%	0.1047%	0.1081%	0.0378%	0.0180%	0.0714%	0.0780%
35	0.0252%	0.0447%	0.0015%	0.0020%	0.0252%	0.0447%	0.0015%	0.0020%	0.1812%	0.1202%	0.1308%	0.1868%	0.0528%	0.0252%	0.0901%	0.0780%
40	0.0828%	0.0779%	0.0051%	0.0035%	0.0828%	0.0779%	0.0051%	0.0035%	0.2400%	0.2219%	0.1734%	0.3452%	0.0693%	0.0323%	0.1139%	0.0867%
45	0.1656%	0.1482%	0.0102%	0.0066%	0.1656%	0.1482%	0.0102%	0.0066%	0.3219%	0.3285%	0.2325%	0.5110%	0.0615%	0.0335%	0.1428%	0.0997%
50	0.2475%	0.2499%	0.0153%	0.0112%	0.2475%	0.2499%	0.0153%	0.0112%	0.4650%	0.5652%	0.3325%	0.7327%	0.0548%	0.0353%	0.2023%	0.1301%
55	0.3303%	0.4199%	0.0204%	0.0188%	0.3303%	0.4199%	0.0204%	0.0188%	0.6571%	0.7241%	0.4275%	1.0148%	0.0516%	0.0345%	0.2499%	0.1821%
60	0.3564%	0.3591%	0.0255%	0.0161%	0.3564%	0.3591%	0.0255%	0.0161%	0.6662%	0.8123%	0.5245%	1.4024%	0.0528%	0.0374%	0.2499%	0.1821%

Sample Ages	Annual Rates of Disability													
	Employees' Pension				State Police				Judges		LEOPS			
	Ordinary		Accidental		Ordinary		Accidental				Ordinary		Accidental	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
25	0.1131%	0.0703%	0.0360%	0.0172%	0.1175%	0.1762%	0.3915%	0.2936%	0.0060%	0.0111%	0.1428%	0.6452%	0.3094%	0.3910%
30	0.1450%	0.0695%	0.0378%	0.0180%	0.1497%	0.2246%	0.4158%	0.3119%	0.0060%	0.0111%	0.1831%	0.6912%	0.3305%	0.3491%
35	0.1812%	0.1202%	0.0528%	0.0252%	0.1883%	0.2824%	0.5098%	0.3823%	0.0060%	0.0260%	0.2288%	0.6975%	0.4028%	0.3434%
40	0.2400%	0.2219%	0.0693%	0.0323%	0.2499%	0.3748%	0.5900%	0.4425%	0.0190%	0.0520%	0.3031%	0.8179%	0.4652%	0.3510%
45	0.3219%	0.3285%	0.0615%	0.0335%	0.3349%	0.5024%	0.6541%	0.4906%	0.0379%	0.0891%	0.4065%	0.9917%	0.5161%	0.3523%
50	0.4650%	0.5652%	0.0548%	0.0353%	0.4787%	0.7181%	0.9140%	0.6855%	0.0569%	0.1300%	0.5482%	1.2280%	0.7213%	0.4521%
55	0.6571%	0.7241%	0.0516%	0.0345%	0.6154%	0.9231%	1.1924%	0.8943%	0.0757%	0.2228%	0.5482%	1.2280%	0.9412%	0.7003%
60	0.6662%	0.8123%	0.0528%	0.0374%	0.7549%	1.1323%	1.4739%	1.1054%	0.0947%	0.2228%	0.5482%	1.2280%	1.1637%	1.2383%

CORS Municipal assumptions were the same as shown for Employees' Retirement Correctional.

Actuarial Assumptions and Methods

A. ACTUARIAL ASSUMPTIONS

Rates of Normal Retirement

Ages	Annual Rates of Normal Retirement													
	Teachers' Retirement		Teachers' Pension				Employees' Retirement		Legislators*		Employees' Pension			
	All Years of Service		At Least 30 Years		Less Than 30 Years		All Years of Service		All Years of Service		At Least 30 Years		Less Than 30 Years	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
45	15.0%	15.0%	12.0%	10.0%			17.0%	16.0%			12.0%	11.0%		
46	15.0%	15.0%	12.0%	10.0%			17.0%	16.0%			12.0%	11.0%		
47	15.0%	15.0%	12.0%	10.0%			17.0%	16.0%			12.0%	11.0%		
48	15.0%	15.0%	12.0%	10.0%			17.0%	16.0%			12.0%	13.0%		
49	15.0%	15.0%	12.0%	10.0%			17.0%	16.0%			10.0%	11.0%		
50	15.0%	15.0%	12.0%	10.0%			10.0%	11.0%			10.0%	11.0%		
51	15.0%	15.0%	12.0%	10.0%			10.0%	11.0%			10.0%	11.0%		
52	15.0%	15.0%	12.0%	10.0%			10.0%	11.0%			10.0%	11.0%		
53	15.0%	15.0%	12.0%	10.0%			10.0%	10.0%			10.0%	11.0%		
54	15.0%	20.0%	12.0%	10.0%			8.0%	10.0%			10.0%	11.0%		
55	15.0%	20.0%	12.0%	11.0%			13.0%	10.0%			10.0%	11.0%		
56	15.0%	20.0%	12.0%	11.0%			8.0%	10.0%			10.0%	11.0%		
57	15.0%	15.0%	12.0%	11.0%			8.0%	10.0%			10.0%	11.0%		
58	20.0%	15.0%	12.0%	11.0%			8.0%	13.0%			10.0%	11.0%		
59	10.0%	18.0%	12.0%	13.0%			11.0%	13.0%			10.0%	11.0%		
60	15.0%	20.0%	13.0%	16.0%			13.0%	13.0%	20.0%	20.0%	10.0%	14.0%		
61	20.0%	18.0%	16.0%	19.0%			11.0%	13.0%	20.0%	20.0%	13.0%	14.0%		
62	20.0%	25.0%	28.0%	26.0%	16.0%	20.0%	27.0%	25.0%	20.0%	20.0%	23.0%	26.0%	16.0%	18.0%
63	20.0%	25.0%	21.0%	23.0%	13.0%	17.0%	23.0%	22.0%	20.0%	20.0%	23.0%	22.0%	13.0%	16.0%
64	20.0%	20.0%	19.0%	21.0%	13.0%	16.0%	19.0%	22.0%	20.0%	20.0%	18.0%	20.0%	13.0%	14.0%
65	25.0%	25.0%	25.0%	25.0%	16.0%	19.0%	20.0%	22.0%	30.0%	30.0%	17.0%	20.0%	13.0%	16.0%
66	25.0%	30.0%	25.0%	30.0%	20.0%	24.0%	25.0%	22.0%	35.0%	35.0%	25.0%	25.0%	18.0%	19.0%
67	25.0%	25.0%	22.0%	27.0%	20.0%	22.0%	25.0%	25.0%	35.0%	35.0%	25.0%	25.0%	16.0%	19.0%
68	20.0%	25.0%	20.0%	27.0%	17.0%	19.0%	18.0%	25.0%	35.0%	35.0%	20.0%	22.0%	16.0%	18.0%
69	20.0%	25.0%	22.0%	25.0%	15.0%	18.0%	18.0%	25.0%	35.0%	35.0%	18.0%	22.0%	16.0%	18.0%
70	20.0%	25.0%	25.0%	27.0%	20.0%	20.0%	20.0%	20.0%	35.0%	35.0%	22.0%	22.0%	16.0%	18.0%
71	20.0%	25.0%	22.0%	27.0%	16.0%	19.0%	20.0%	20.0%	35.0%	35.0%	20.0%	22.0%	16.0%	18.0%
72	20.0%	25.0%	30.0%	22.0%	16.0%	17.0%	20.0%	20.0%	35.0%	35.0%	25.0%	22.0%	17.0%	18.0%
73	20.0%	25.0%	22.0%	25.0%	20.0%	17.0%	20.0%	20.0%	50.0%	50.0%	22.0%	25.0%	17.0%	18.0%
74	15.0%	18.0%	22.0%	27.0%	18.0%	15.0%	20.0%	20.0%	50.0%	50.0%	22.0%	25.0%	17.0%	18.0%
75	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	18.0%	18.0%
76													18.0%	18.0%
77 & Over													100.0%	100.0%

* Retirement rates for Legislative members are assumed to apply every four years to members eligible for retirement (beginning with the year ending June 30, 2015, and each fourth year thereafter).

Actuarial Assumptions and Methods

A. ACTUARIAL ASSUMPTIONS

Rates of Normal Retirement

Ages	Annual Rates of Normal Retirement													
	Correctional Officers				State Police *				Judges		LEOPS			
	At Least 20 Years		Less Than 20 Years		At Least 22 Years		Less Than 22 Years		All Years of Service		At Least 25 Years		Less Than 25 Years	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
40	25.0%	25.0%			10.0%	10.0%					40.0%	40.0%		
41	18.0%	18.0%			15.0%	15.0%					40.0%	40.0%		
42	18.0%	18.0%			20.0%	20.0%					40.0%	40.0%		
43	18.0%	18.0%			25.0%	25.0%					40.0%	40.0%		
44	18.0%	18.0%			20.0%	20.0%					40.0%	40.0%		
45	15.0%	15.0%			30.0%	30.0%					40.0%	40.0%		
46	15.0%	15.0%			25.0%	25.0%					40.0%	40.0%		
47	15.0%	15.0%			25.0%	25.0%					40.0%	40.0%		
48	13.0%	13.0%			25.0%	25.0%					40.0%	40.0%		
49	13.0%	13.0%			30.0%	30.0%					40.0%	40.0%		
50	13.0%	13.0%			35.0%	35.0%	7.0%	7.0%			25.0%	25.0%	5.0%	5.0%
51	12.0%	12.0%			20.0%	20.0%	7.0%	7.0%			25.0%	25.0%	5.0%	5.0%
52	12.0%	12.0%			20.0%	20.0%	7.0%	7.0%			25.0%	25.0%	5.0%	5.0%
53	12.0%	12.0%			35.0%	35.0%	7.0%	7.0%			20.0%	20.0%	4.0%	4.0%
54	12.0%	12.0%			20.0%	20.0%	7.0%	7.0%			30.0%	30.0%	4.0%	4.0%
55	12.0%	12.0%	3.0%	3.0%	40.0%	40.0%	7.0%	7.0%			30.0%	30.0%	4.0%	4.0%
56	11.0%	11.0%	3.0%	3.0%	35.0%	35.0%	15.0%	15.0%			30.0%	30.0%	5.0%	5.0%
57	11.0%	11.0%	3.0%	3.0%	35.0%	35.0%	15.0%	15.0%			20.0%	20.0%	5.0%	5.0%
58	11.0%	11.0%	3.0%	3.0%	35.0%	35.0%	15.0%	15.0%			20.0%	20.0%	5.0%	5.0%
59	11.0%	11.0%	3.0%	3.0%	50.0%	50.0%	15.0%	15.0%			20.0%	20.0%	5.0%	5.0%
60	11.0%	11.0%	3.0%	3.0%	100.0%	100.0%	100.0%	100.0%	7.0%	10.0%	25.0%	25.0%	6.0%	6.0%
61	13.0%	13.0%	3.0%	3.0%					7.0%	10.0%	25.0%	25.0%	6.0%	6.0%
62	35.0%	35.0%	10.0%	10.0%					7.0%	15.0%	30.0%	30.0%	15.0%	15.0%
63	25.0%	25.0%	5.0%	5.0%					7.0%	10.0%	30.0%	30.0%	15.0%	15.0%
64	25.0%	25.0%	12.0%	12.0%					7.0%	10.0%	30.0%	30.0%	15.0%	15.0%
65	30.0%	30.0%	12.0%	12.0%					7.0%	10.0%	30.0%	30.0%	30.0%	30.0%
66	30.0%	30.0%	20.0%	20.0%					7.0%	10.0%	50.0%	50.0%	30.0%	30.0%
67	30.0%	30.0%	15.0%	15.0%					7.0%	10.0%	50.0%	50.0%	30.0%	30.0%
68	30.0%	30.0%	10.0%	10.0%					10.0%	15.0%	70.0%	70.0%	30.0%	30.0%
69	35.0%	35.0%	20.0%	20.0%					10.0%	15.0%	70.0%	70.0%	30.0%	30.0%
70 & Over	100.0%	100.0%	100.0%	100.0%					100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* 50% of participants are expected to elect DROP participation.

Actuarial Assumptions and Methods

A. ACTUARIAL ASSUMPTIONS

Rates of Normal Retirement

Ages	Additional Rates to Add to Annual Rates of Normal Retirement at Age of First Eligibility							
	Teachers' Pension Reformed				Employees' Pension Reformed			
	At Least 30 Years		Less Than 30 Years		At Least 30 Years		Less Than 30 Years	
	Male	Female	Male	Female	Male	Female	Male	Female
55 and Under	39.0%	33.0%			35.0%	35.0%		
56	32.0%	26.0%			28.0%	28.0%		
57	24.0%	19.0%			21.0%	21.0%		
58	15.0%	11.0%			14.0%	14.0%		
59	4.0%	2.0%			7.0%	7.0%		
60	0.0%	0.0%			0.0%	0.0%		
61	0.0%	0.0%			0.0%	0.0%		
62	0.0%	0.0%			0.0%	0.0%		
63	0.0%	0.0%			0.0%	0.0%		
64	0.0%	0.0%			0.0%	0.0%		
65+	0.0%	0.0%	20.0%	16.0%	0.0%	0.0%	25.0%	25.0%

State Police Reformed: Add additional 20% to annual rate at age of first eligibility if under age 50.

Actuarial Assumptions and Methods

A. ACTUARIAL ASSUMPTIONS

Rates of Early Retirement

Ages	Annual Rates of Early Retirement *											
	Teachers' Retirement		Teachers' Pension				Employees' Retirement		Employees' Pension			
			Non-Reformed		Reformed				Non-Reformed		Reformed	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
40	5.0%	5.0%					5.0%	5.0%				
41	5.0%	5.0%					5.0%	5.0%				
42	5.0%	5.0%					5.0%	5.0%				
43	5.0%	5.0%					5.0%	5.0%				
44	5.0%	5.0%					5.0%	5.0%				
45	5.0%	5.0%					5.0%	5.0%				
46	5.0%	5.0%					5.0%	5.0%				
47	5.0%	5.0%					5.0%	5.0%				
48	5.0%	5.0%					5.0%	5.0%				
49	5.0%	5.0%					5.0%	5.0%				
50	5.0%	5.0%					5.0%	5.0%				
51	5.0%	5.0%					5.0%	5.0%				
52	5.0%	5.0%					5.0%	5.0%				
53	5.0%	5.0%					5.0%	5.0%				
54	5.0%	5.0%					5.0%	5.0%				
55	10.0%	10.0%	2.0%	2.5%			5.0%	5.0%	1.8%	2.2%		
56	5.0%	5.0%	2.0%	2.5%			5.0%	5.0%	1.5%	2.5%		
57	5.0%	5.0%	2.5%	2.5%			5.0%	5.0%	1.5%	2.5%		
58	5.0%	5.0%	2.0%	3.0%			5.0%	5.0%	1.5%	3.5%		
59	5.0%	5.0%	4.0%	4.0%			5.0%	5.0%	2.0%	3.0%		
60			3.5%	6.0%	10.0%	13.5%			3.0%	4.5%	7.8%	11.7%
61			6.5%	7.0%	6.5%	7.0%			5.0%	5.0%	5.0%	5.0%
62					7.0%	7.5%					5.5%	5.5%
63					7.5%	8.0%					6.0%	6.0%
64					8.0%	8.5%					6.5%	6.5%

* Divisions without early retirement eligibility are not shown.

Actuarial Assumptions and Methods

A. ACTUARIAL ASSUMPTIONS

Social Security Covered Compensation

Teachers' Retirement	Not applicable
Teachers' Pension	Future covered compensation levels, used to estimate member contributions and retirement allowances, were calculated using a 3.10% per annum compounded increase in the 2019 Social Security Maximum Taxable Wage Base.
Employees' Retirement	Not applicable
Employees' Pension	Future covered compensation levels, used to estimate member contributions and retirement allowances, were calculated using a 3.10% per annum compounded increase in the 2019 Social Security Maximum Taxable Wage Base.
State Police Retirement	Not applicable
Judges' Pension	Not applicable
LEOPS	Future covered compensation levels, used to estimate member contributions and retirement allowances, were calculated using a 3.10% per annum compounded increase in the 2019 Social Security Maximum Taxable Wage Base.
Correctional Officers' Retirement System	Not applicable

Actuarial Assumptions and Methods

B. ACTUARIAL PROCEDURES

1. Asset Valuation Method

All six Systems use a method based on the principle that the difference between actual and expected investment returns should be subject to partial recognition to smooth out fluctuations in the total return achieved by the fund from year to year. Under this method, the actuarial value of assets reflects annually one-fifth of the market value gains or losses for the five prior years. The resulting value is restricted to be not less than 80% of market value nor greater than 120% of market value.

For the Employees' Retirement and Pension System and for LEOPS, assets must be allocated between State and Municipal Corporation members. Beginning July 1, 1984, this allocation is based upon actual cash flows and shared investment results.

Actuarial Assumptions and Methods

B. ACTUARIAL PROCEDURES

2. Funding Method

All six Systems use the individual entry age normal method to determine costs. Under this funding method, a total contribution rate is determined which consists of two elements, the normal cost rate and the Unfunded Actuarial Liability (UAL) rate.

The individual Entry Age Normal cost rate is determined as the value, as of age at entry into the plan, of the member's projected future benefits, and divided by the value, also as of the member's entry age, of the member's expected future salary. For purposes of calculating the normal cost rate, the same benefit accrual rates used to calculate the present value of future benefits are used to calculate the normal cost. The benefit provisions applicable to each member are used in developing his/her individual normal cost rate.

In addition to contributions required to meet the System's normal cost, contributions will be required to fund the System's unfunded actuarial liability. Actuarial liability is defined as the present value of future benefits less the present value of future normal costs. The unfunded actuarial liability for all members is the actuarial liability less the actuarial value of the System's assets.

The System's unfunded actuarial liability is funded over a 25-year closed amortization period ending June 30, 2039 (19 years remaining as of the June 30, 2019 valuation date) as a level percentage of payroll.

There is an additional component in the Unfunded Actuarial Accrued Liability amortization contribution rate that accounts for the effects of the lag between the valuation date and when the contribution is made. This calculation assumes the contributions that would be received in fiscal year 2020 are equal to the budgeted contributions developed in the valuation as of June 30, 2018, plus the proportionate share of reinvested savings allocated to each System for fiscal year 2020 under the pension reforms.

A portion of the savings from the 2011 pension reforms passed by the General Assembly are to be reinvested as additional contributions into the Systems. Beginning in fiscal year 2016, \$75 million of additional contributions are to be reinvested each year until the combined System reaches 85% funded.

Summary of Assumptions Used

June 30, 2019

Miscellaneous and Technical Assumptions

Marriage Assumption:	100% of males and females are assumed to be married for purposes of death-in-service benefits; 80% of healthy males and females, and 65% of disabled males and females, are assumed to be married for purposes of post-retirement death benefits.
Pay Increase Timing:	Teachers' Systems assume beginning of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date. All other Systems assume middle of (Fiscal) year. This is equivalent to assuming that reported pays represent the annualized rate of pay at the beginning of the (Fiscal) year.
Decrement Timing:	Decrements of all types are assumed to occur mid-year, except for Teachers' Systems which assumed beginning of year (i.e., July 1) for retirement and termination.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and rounded integer service on the date the decrement is assumed to occur.
Benefit Service:	Exact fractional service is used to determine the amount of benefit payable.
Decrement Operation:	Mortality and disability operate during retirement eligibility.
Incidence of Contributions:	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made. New entrant normal cost contributions are applied to the funding of new entrant benefits.
Unused Sick Leave:	Each member is assumed to have the following months of service at retirement attributable to sick leave. Correctional Officers: 2 months Employees' and Teachers' Retirement: 10 months Judges and Legislators: 0 months Employees' and Teachers' Pension: 4 and 5 months, respectively LEOPS and State Police: 6 months and 7 months, respectively
Unknown Data for Participants:	Average characteristics of the group as a whole are used to fill in the unknown data.
Age of Spouse:	In the absence of complete data, female retirees are assumed to be 2 years younger than male spouses, and male retirees are assumed to be 3 years older than female spouses.

Summary of Assumptions Used

June 30, 2019

Miscellaneous and Technical Assumptions

- Option Elections:** It was assumed optional forms of payment were actuarially equivalent to the normal form of payment.
- Actuarial Equivalence:**
TCS, ECS, & Judges 5.85% interest, RP 2014 Combined Annuitant Mortality, 50% Unisex, 2.29% COLA pre-reform, 1.49% COLA post-reform
- State Police & LEOPS 5.85% interest, RP 2014 Combined Annuitant Mortality, 85% Unisex, 2.46% COLA pre-reform, 1.49% COLA post-reform.
- Reinvested Savings Allocation:** Total savings from the 2011 pension reforms that are to be reinvested in each of the Systems as additional contributions are allocated between the Systems in proportion to the savings as measured in the actuarial valuation as of June 30, 2011.
- Vested Deferred Benefit Commencement:** Active members assumed to terminate with a vested benefit, current vested deferred, and inactive members are assumed to commence receiving benefits at the following ages:
- Correctional Officers: Age 55*
Employees' and Teachers' Retirement, Judges, and Legislators: Age 60
Employees' and Teachers' Pension: Age 62 or age 55 if the member has at least 15 years of service
Employees' and Teachers' Pension Reformed: Age 65 or age 60 if the member has at least 15 years of service
LEOPS and State Police: Age 50
- Liability Adjustments:** For State Police and LEOPS, the value of the 4% DROP interest credits compared to the valuation interest rate of 7.40% was accounted for through the use of certain load factors as shown in the table below. The assumed length of time members would stay in the DROP was 4.71 years for State Police and 4.85 years for LEOPS, based on the average projected DROP period of DROP members in the valuation data provided by the SRA.

<u>Load Applied to</u>	<u>Load Factor</u>	
	<u>State Police</u>	<u>LEOPS</u>
Active Normal Retirement Decrement	0.9896	0.9887
Liabilities for Members in the DROP	0.9917	0.9897
DROP Account Balances	0.9221	0.9156

Definitions of Technical Terms

Accrued Service

Service credited under the system which was rendered before the date of the actuarial valuation.

Actuarial Accrued Liability

The difference between the actuarial present value of system benefits and the actuarial present value of future normal costs. Also referred to as "past service liability."

Actuarial Assumptions

Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method

A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future benefits" between future normal costs and Actuarial Accrued Liability. Sometimes referred to as the "actuarial funding method."

Actuarial Equivalent

One series of payments is said to be actuarially equivalent to another series of payments if the two series have the same actuarial present value.

Actuarial Gain (Loss)

The difference between actual unfunded actuarial accrued liabilities and anticipated unfunded actuarial accrued liabilities -- during the period between two valuation dates. It is a measurement of the difference between actual and expected experience.

Actuarial Present Value

The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest, and by probabilities of payments.

Amortization

Paying off an interest-discounted amount with periodic payments of interest and (generally) principal -- as opposed to paying off with a lump sum payment.

Definitions of Technical Terms

Normal Cost

The portion of the actuarial present value of future benefits that is assigned to the current year by the actuarial cost method. Sometimes referred to as "current service cost."

Projected Benefit Obligation

The portion of a member's projected benefit attributable to service before the valuation date - allocated based on the ratio of accrued service to projected total service and based on anticipated future compensation.

Unfunded Actuarial Accrued Liabilities

The difference between actuarial accrued liabilities and valuation assets. Sometimes referred to as "unfunded past service liability" or "unfunded supplemental present value."

Most retirement systems have unfunded actuarial accrued liabilities. They arise each time new benefits are added and each time an actuarial loss occurs.

The existence of unfunded actuarial accrued liabilities is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liabilities do not represent a debt that is payable today. What is important is the ability to amortize the unfunded actuarial accrued liabilities and the trend in their amount (after due allowance for devaluation of the dollar).

APPENDIX B



MEMBERSHIP INFORMATION

State Retirement and Pension System Summary of Membership Data as of June 30, 2019 (State and Municipal)

		Active Members		Retirees and Beneficiaries					Vested Former Members (Includes Inactives)	Total
		Number	Salary	Number	Benefits#	Avg. Monthly Benefit	Avg. Age	Avg. Age at Ret.*	Number	Number
Teachers' Retirement - STATE	Total	98	\$ 11,904,870							
	Vested	98	\$ 11,904,870							
	Non-vested	0	\$ -	3,338	\$ 130,843,833	\$ 3,267	80.6	62.2	55	3,491
Teachers' Pension - STATE	Total	8,985	\$ 558,957,899							
	Vested	4,700	\$ 331,533,088							
	Non-vested	4,285	\$ 227,424,811	6,254	\$ 112,060,149	\$ 1,493	73.2	63.5	2,975	18,214
Teachers' Retirement - LOCAL	Total	236	\$ 22,067,745							
	Vested	236	\$ 22,067,745							
	Non-vested	0	\$ -	21,484	\$ 878,398,213	\$ 3,407	78.0	58.3	98	21,818
Teachers' Pension - LOCAL	Total	98,463	\$ 6,560,132,920							
	Vested	59,008	\$ 4,526,280,274							
	Non-vested	39,455	\$ 2,033,852,646	48,075	\$ 1,165,949,864	\$ 2,021	70.9	61.9	21,346	167,884
Employees' Retirement	Total	8,119	\$ 419,453,514							
	Vested	5,417	\$ 296,395,346							
	Non-vested	2,702	\$ 123,058,168	19,955	\$ 497,778,077	\$ 2,079	73.5	57.3	768	28,842
Employees' Pension	Total	73,098	\$ 3,990,487,247							
	Vested	39,108	\$ 2,374,649,395							
	Non-vested	33,990	\$ 1,615,837,852	60,757	\$ 957,107,780	\$ 1,313	70.5	61.2	24,593	158,448
State Police	Total	1,364	\$ 106,977,874							
	Vested	882	\$ 79,097,210							
	Non-vested	482	\$ 27,880,664	2,505	\$ 128,577,798	\$ 4,277	64.5	47.8	89	3,958
Judges	Total	315	\$ 48,934,800							
	Vested	207	\$ 32,230,936							
	Non-vested	108	\$ 16,703,864	431	\$ 35,371,231	\$ 6,839	77.5	65.3	8	754
LEOPS	Total	2,683	\$ 180,963,077							
	Vested	1,502	\$ 115,009,626							
	Non-vested	1,181	\$ 65,953,451	2,053	\$ 74,686,123	\$ 3,032	61.1	52.8	311	5,047
CORS	Total	97	\$ 5,583,279							
	Vested	42	\$ 2,804,756							
	Non-vested	55	\$ 2,778,523	40	\$ 1,069,529	\$ 2,228	60.1	59.7	3	140
Total Systems	Total	193,458	\$ 11,905,463,225							
	Vested	111,200	\$ 7,791,973,246							
	Non-vested	82,258	\$ 4,113,489,979	164,892	\$ 3,981,842,599	\$ 2,012	72.0	60.8	50,246	408,596

* Includes normal and early service retirees only.

#Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019.

State Retirement and Pension System Summary of Membership Data as of June 30, 2019 (State Only)

		Active Members		Retirees and Beneficiaries				Vested Former Members (Includes Inactives)		Total Number
		Number	Salary	Number	Benefits#	Avg. Monthly Benefit	Avg. Age	Avg. Age at Ret.*	Number	
Teachers'	Total	98	\$ 11,904,870							
Retirement - STATE	Vested	98	\$ 11,904,870							
	Non-vested	0	\$ -	3,338	\$ 130,843,833	\$ 3,267	80.6	62.2	55	3,491
Teachers'	Total	8,985	\$ 558,957,899							
Pension - STATE	Vested	4,700	\$ 331,533,088							
	Non-vested	4,285	\$ 227,424,811	6,254	\$ 112,060,149	\$ 1,493	73.2	63.5	2,975	18,214
Teachers'	Total	236	\$ 22,067,745							
Retirement - LOCAL	Vested	236	\$ 22,067,745							
	Non-vested	0	\$ -	21,484	\$ 878,398,213	\$ 3,407	78.0	58.3	98	21,818
Teachers'	Total	98,463	\$ 6,560,132,920							
Pension - LOCAL	Vested	59,008	\$ 4,526,280,274							
	Non-vested	39,455	\$ 2,033,852,646	48,075	\$ 1,165,949,864	\$ 2,021	70.9	61.9	21,346	167,884
Employees'	Total	8,076	\$ 416,736,664							
Retirement	Vested	5,374	\$ 293,678,496							
	Non-vested	2,702	\$ 123,058,168	17,291	\$ 437,431,867	\$ 2,108	72.6	56.4	751	26,118
Employees'	Total	48,356	\$ 2,815,290,704							
Pension	Vested	26,401	\$ 1,675,316,623							
	Non-vested	21,955	\$ 1,139,974,081	44,681	\$ 742,155,528	\$ 1,384	70.4	61.8	18,210	111,247
State Police	Total	1,364	\$ 106,977,874							
	Vested	882	\$ 79,097,210							
	Non-vested	482	\$ 27,880,664	2,505	\$ 128,577,798	\$ 4,277	64.5	47.8	89	3,958
Judges	Total	315	\$ 48,934,800							
	Vested	207	\$ 32,230,936							
	Non-vested	108	\$ 16,703,864	431	\$ 35,371,231	\$ 6,839	77.5	65.3	8	754
LEOPS	Total	1,615	\$ 113,981,595							
	Vested	897	\$ 71,892,854							
	Non-vested	718	\$ 42,088,741	1,583	\$ 56,691,749	\$ 2,984	62.4	52.9	188	3,386
Total Systems	Total	167,508	\$ 10,654,985,071							
	Vested	97,803	\$ 7,044,002,096							
	Non-vested	69,705	\$ 3,610,982,975	145,642	\$ 3,687,480,233	\$ 2,110	72.1	60.6	43,720	356,870

* Includes normal and early service retirees only.

#Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019.

State Retirement and Pension System Summary of Membership Data as of June 30, 2019 (Municipal Only)

		Active Members		Retirees and Beneficiaries				Vested Former Members (Includes Inactives)		Total
		Number	Salary	Number	Benefits#	Avg. Monthly Benefit	Avg. Age	Avg. Age at Ret.*	Number	Number
Employees' Retirement	Total	43	\$ 2,716,850							
	Vested	43	\$ 2,716,850							
	Non-vested	0	\$ -	2,664	\$ 60,346,210	\$ 1,888	79.4	63.2	17	2,724
Employees' Pension	Total	24,742	\$ 1,175,196,543							
	Vested	12,707	\$ 699,332,772							
	Non-vested	12,035	\$ 475,863,771	16,076	\$ 214,952,252	\$ 1,114	70.6	59.7	6,383	47,201
LEOPS	Total	1,068	\$ 66,981,482							
	Vested	605	\$ 43,116,772							
	Non-vested	463	\$ 23,864,710	470	\$ 17,994,374	\$ 3,190	57.1	52.6	123	1,661
CORS	Total	97	\$ 5,583,279							
	Vested	42	\$ 2,804,756							
	Non-vested	55	\$ 2,778,523	40	\$ 1,069,529	\$ 2,228	60.1	59.7	3	140
Total Systems	Total	25,950	\$ 1,250,478,154							
	Vested	13,397	\$ 747,971,150							
	Non-vested	12,553	\$ 502,507,004	19,250	\$ 294,362,366	\$ 1,274	71.5	62.5	6,526	51,726

* Includes normal and early service retirees only.

#Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019.

Active Membership Information

Maryland State Retirement and Pension System Active Membership Statistics June 30, 2019				
System	Number	Average Age	Average Credited Service	Average Salary
Teachers' Retirement	334	68.3	43.0	\$ 101,714
Teachers' Pension	107,448	45.0	11.9	66,256
Employees' Retirement – State	247	66.7	43.3	77,226
Employees' Retirement – Municipal	43	64.5	42.4	63,183
Employees' Retirement – Legislators	189	53.3	7.6	50,489
Employees' Retirement – Correctional Officers	7,640	44.5	12.3	50,801
Employees' Retirement – Total	8,119	45.5	13.3	51,663
Employees' Pension – State	48,356	48.2	12.0	58,220
Employees' Pension – Municipal	24,742	49.3	10.6	47,498
Employees' Pension – Total	73,098	48.6	11.5	54,591
State Police	1,364	36.4	12.1	78,430
Judges	315	57.5	8.1	155,349
LEOPS – State	1,615	42.2	10.9	70,577
LEOPS – Municipal	1,068	39.3	10.8	62,717
LEOPS – Total	2,683	41.0	10.8	67,448
CORS	97	40.2	10.3	57,560
TOTAL SYSTEMS	193,458	46.3	11.9	61,540
	Teachers' Retirement		Employees' Retirement	
	Number	Earnings	Number	Earnings
Unlimited COLA	202	\$ 21,484,338	168	\$ 12,680,453
5% COLA Cap	81	7,853,336	90	7,021,900
Bifurcate	51	4,634,941	32	2,089,286
	<u>334</u>	<u>\$ 33,972,615</u>	<u>290</u>	<u>\$ 21,791,639</u>

Active Membership – Age & Service Distribution

June 30, 2019

Teachers' Combined System

Age Nearest Birthday	Nearest Whole Years of Service on the Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20	15							15	\$ 181,374
20-24	2,241	12						2,253	94,188,913
25-29	7,665	2,635	3					10,303	500,257,199
30-34	4,516	5,871	1,995	9				12,391	696,165,007
35-39	3,102	2,722	6,128	1,897	11			13,860	906,114,147
40-44	2,731	2,066	2,910	4,662	1,302	2		13,673	983,333,441
45-49	2,591	2,124	2,447	2,698	3,984	848	4	14,696	1,098,236,763
50-54	2,121	2,002	2,394	2,127	2,318	2,447	619	14,028	1,026,552,364
55-59	1,374	1,530	2,289	2,107	1,812	1,291	1,592	11,995	836,473,005
60	178	176	378	413	389	223	322	2,079	142,530,914
61	182	217	332	413	352	243	362	2,101	145,682,397
62	151	185	321	392	355	249	333	1,986	136,272,335
63	122	174	265	292	266	170	318	1,607	114,540,282
64	114	129	209	255	227	141	268	1,343	91,748,946
65	83	100	172	207	228	127	228	1,145	79,736,481
66	67	106	166	156	176	105	235	1,011	70,819,018
67	56	66	106	114	114	100	196	752	55,446,511
68	37	60	95	91	87	70	151	591	41,558,892
69	36	60	65	76	61	38	110	446	32,815,732
70	17	52	64	45	38	37	92	345	23,211,875
71	16	32	42	42	47	25	71	275	19,086,847
72	19	27	37	32	28	26	70	239	15,570,357
73	15	18	22	23	19	15	46	158	10,092,753
74	13	11	19	18	11	12	29	113	7,412,154
75	11	6	14	20	9	7	29	96	6,434,974
76	5	8	14	9	6	5	27	74	5,476,930
77	3	4	4	11	4	4	27	57	3,888,438
78	2	5	7	7	7	3	18	49	3,203,973
79+		11	18	15	12	7	38	101	6,031,412
Totals	27,483	20,409	20,516	16,131	11,863	6,195	5,185	107,782	\$7,153,063,434

Active Membership – Age & Service Distribution

June 30, 2019

Employees' Combined System

Age Nearest Birthday	Nearest Whole Years of Service on the Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20	22							22	\$ 593,758
20-24	1,165	23						1,188	41,318,768
25-29	4,174	799	16					4,989	206,614,390
30-34	4,161	2,388	942	33				7,524	358,647,888
35-39	3,745	2,230	1,980	558	18			8,531	438,617,693
40-44	2,747	1,806	1,883	1,471	520	12		8,439	462,639,270
45-49	2,521	1,769	1,851	1,633	1,396	426	59	9,655	546,156,515
50-54	2,529	1,877	2,099	1,713	1,562	1,138	858	11,776	668,534,757
55-59	2,203	1,842	2,160	1,745	1,681	1,243	1,942	12,816	743,598,365
60	404	338	395	314	286	236	490	2,463	142,893,960
61	329	338	340	328	317	210	511	2,373	138,204,065
62	268	323	350	293	246	193	412	2,085	121,657,225
63	255	275	284	225	194	141	368	1,742	102,544,104
64	163	214	229	232	162	121	317	1,438	85,443,700
65	158	187	218	185	142	91	293	1,274	76,126,671
66	124	136	154	146	89	86	256	991	58,288,926
67	105	122	139	89	77	57	168	757	45,168,323
68	88	92	126	91	70	43	160	670	40,062,756
69	51	89	84	70	54	29	121	498	28,544,315
70	61	63	88	76	38	27	86	439	24,134,838
71	42	49	60	56	33	20	79	339	18,963,251
72	36	28	49	44	35	20	61	273	15,320,588
73	28	38	36	30	20	14	38	204	11,006,181
74	21	22	25	24	10	14	48	164	8,707,511
75	20	28	22	27	10	9	21	137	6,554,916
76	18	13	19	13	8	8	15	94	4,647,846
77	21	17	13	13	11	6	18	99	4,248,382
78	7	10	11	10	7	3	17	65	3,153,687
79+	5	25	38	26	25	10	43	172	7,548,112
Totals	25,471	15,141	13,611	9,445	7,011	4,157	6,381	81,217	\$4,409,940,761

Active Membership – Age & Service Distribution

June 30, 2019

State Police

Age Nearest Birthday	Nearest Whole Years of Service on the Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20	10							10	\$ 261,440
20-24	90	5						95	4,185,195
25-29	123	117	6					246	15,126,377
30-34	30	130	96	10				266	19,057,810
35-39	10	48	98	97	6			259	21,264,453
40-44	4	19	33	76	63	5		200	18,570,969
45-49	1	6	24	38	81	19	1	170	16,868,038
50-54	1	5	15	15	34	18	8	96	9,395,112
55-59			3	5	2	2	8	20	2,059,399
60				1	1			2	189,081
Totals	269	330	275	242	187	44	17	1,364	\$106,977,874

Active Membership – Age & Service Distribution

June 30, 2019

Judges

Age Nearest Birthday	Nearest Whole Years of Service on the Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
35-39	1							1	\$ 146,333
40-44	12	2						14	2,114,162
45-49	31	11	2					44	6,761,052
50-54	19	21	5	1				46	7,125,718
55-59	23	22	18	11				74	11,413,242
60	1	2	1	4				8	1,293,564
61	5	5	5	5				20	3,119,260
62	3	4	3	10				20	3,132,360
63	7	4	2	2				15	2,348,295
64	3	2	7	4				16	2,446,128
65	1	4	1	5				11	1,749,563
66	1		2	5				8	1,245,364
67	1	4	9					14	2,232,862
68	1	3	1	4				9	1,484,797
69		1	1	6				8	1,236,164
70		1		5				6	939,622
71				1				1	146,314
Totals	109	86	57	63	0	0	0	315	\$48,934,800

Active Membership – Age & Service Distribution

June 30, 2019

LEOPS

Age Nearest Birthday	Nearest Whole Years of Service on the Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
20-24	105	9						114	\$ 5,223,343
25-29	230	125	6					361	19,252,143
30-34	159	186	98	8				451	26,601,018
35-39	49	76	141	71	5			342	22,707,469
40-44	50	42	79	125	39	2		337	23,936,723
45-49	40	44	56	101	133	31	1	406	30,637,761
50-54	54	59	43	53	85	41	10	345	26,964,203
55-59	23	42	35	21	35	13	14	183	14,416,123
60	1	7	5	5	1		5	24	1,878,717
61	4	6	4	2	2	2	1	21	1,518,182
62	1	3	5	3	3	1	3	19	1,554,199
63	1	2	6	5	1		4	19	1,615,492
64	2	3	7		3	2		17	1,241,505
65		2	6	1	1		1	11	852,997
66	1	4	1				1	7	441,703
67				3	1			4	314,500
68			3	2		1	2	8	718,598
69		1	1	1	1		1	5	487,502
70		1	1	1				3	219,794
71		1			2			3	154,813
72			1		1	1		3	226,292
Totals	720	613	498	402	313	94	43	2,683	\$180,963,077

Active Membership – Age & Service Distribution

June 30, 2019

CORS

Age Nearest Birthday	Nearest Whole Years of Service on the Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
20-24	3							3	\$ 132,434
25-29	10	4						14	667,618
30-34	7	9	1					17	883,999
35-39	5	6	8					19	1,020,175
40-44	1	5		2	3			11	700,492
45-49	1	2	2	6	3			14	908,938
50-54		2	2	1	1	1		7	423,154
55-59			1	1	1	1	2	6	503,561
60			2					2	120,307
61	1	2		1				4	222,601
Totals	28	30	16	11	8	2	2	97	\$5,583,279

Retired Membership Statistics June 30, 2019 (State and Municipal)

System	Number	Average Age	Average Credited Service*	Average Final Average Salary*	Average Benefit
Teachers' Retirement	24,822	78.3	29.2	\$ 54,057	\$ 40,659
Teachers' Pension	54,329	71.1	22.0	59,578	23,524
Employees' Retirement – State	17,291	72.6	24.7	41,350	25,298
Employees' Retirement – Municipal	2,664	79.4	24.8	32,992	22,652
Employees' Retirement – Total	19,995	73.4	24.7	40,284	24,949
Employees' Pension – State	44,681	70.4	21.0	46,189	16,610
Employees' Pension – Municipal	16,076	70.6	17.6	39,985	13,371
Employees' Pension – Total	60,757	70.5	20.1	44,547	15,753
State Police	2,505	64.5	23.5	54,598	51,328
Judges	431	77.5	14.0	159,776	82,068
LEOPS – State	1,583	62.4	22.4	60,343	35,813
LEOPS – Municipal	470	57.1	22.0	65,708	38,286
LEOPS – Total	2,053	61.1	22.3	61,571	36,379
CORS – Municipal	40	60.1	19.6	65,368	26,738
Total - State	145,642	72.1	23.2	52,584	25,319
Total - Municipal	19,250	71.5	18.7	39,698	15,292
TOTAL SYSTEMS	164,892	72.0	22.7	51,080	24,148

* Only non-zero values included in averages.

Retired Membership Statistics –by Type

June 30, 2019

(State and Municipal)

System	Service Retirees		Disabilities		Beneficiaries	
	Number	Average Age	Number	Average Age	Number	Average Age
Teachers' Retirement	21,748	78.1	595	77.6	2,479	80.5
Teachers' Pension	48,654	71.6	3,969	64.3	1,706	72.5
Employees' Retirement – State	13,264	72.8	1,621	61.5	2,406	78.5
Employees' Retirement – Municipal	1,951	79.4	173	78.2	540	79.6
Employees' Retirement – Total	15,215	73.7	1,794	63.1	2,946	78.7
Employees' Pension – State	36,574	71.2	5,503	64.2	2,604	72.1
Employees' Pension – Municipal	12,497	72.1	2,723	63.5	856	71.7
Employees' Pension – Total	49,071	71.4	8,226	64.0	3,460	72.0
State Police	1,536	65.0	610	57.7	359	73.9
Judges	313	75.4	4	68.5	114	83.6
LEOPS – State	1,140	64.1	333	55.1	110	66.4
LEOPS – Municipal	333	59.9	118	50.0	19	51.0
LEOPS – Total	1,473	63.1	451	53.8	129	64.1
CORS – Municipal	29	62.0	9	53.3	2	62.3
Total - State	123,229	72.6	12,635	64.0	9,780	76.0
Total - Municipal	14,810	72.8	3,023	63.8	1,415	74.4
TOTAL SYSTEMS	138,039	72.7	15,658	63.9	11,195	75.8

Retired Membership – Attained Age June 30, 2019 (State and Municipal)

Age at Valuation Date	Teachers'		Employees		State Police		Judges		LEOPS		CORS (Municipal)		Total	
	Number	Annual Benefits#	Number	Annual Benefits#	Number	Annual Benefits#	Number	Annual Benefits#	Number	Annual Benefits#	Number	Annual Benefits#	Number	Annual Benefits
Under 30	9	\$ 101,192	35	\$ 288,629	3	\$ 83,964	-	-	7	\$ 165,419	-	-	54	\$ 639,204
30-34	18	328,691	69	1,443,233	16	679,841	-	-	10	358,517	-	-	113	2,810,282
35-39	63	2,056,252	125	2,696,179	13	507,663	-	-	34	1,235,654	-	-	235	6,495,748
40-44	112	3,864,359	278	6,043,169	60	2,798,261	-	-	44	1,569,718	1	23,888	495	14,299,394
45-49	232	7,294,228	877	21,002,095	192	10,197,941	-	-	147	6,060,490	2	\$ 25,356	1,450	44,580,111
50-54	505	17,371,980	2,039	49,199,647	363	19,807,216	-	-	314	11,966,123	5	78,279	3,226	98,423,245
55-59	1,927	59,986,414	4,689	111,982,985	325	17,421,028	2	\$ 142,938	366	14,014,261	12	429,531	7,321	203,977,158
60-64	7,221	212,831,715	11,071	232,527,365	316	17,355,950	17	1,583,319	394	14,725,546	12	286,300	19,031	479,310,195
65-69	18,634	555,748,610	18,509	337,908,187	333	18,009,569	57	5,445,337	354	12,330,737	5	115,821	37,892	929,558,260
70-74	20,775	607,562,399	17,384	307,759,808	352	17,394,045	107	9,429,138	231	7,628,892	2	31,878	38,851	949,806,159
75-79	13,603	378,864,981	11,485	180,934,931	270	12,382,444	88	7,181,116	93	2,885,091	1	78,477	25,540	582,327,040
80-84	8,050	221,121,803	7,352	108,522,059	161	7,079,914	73	5,989,669	44	1,372,387	-	-	15,680	344,085,832
85-89	4,948	138,125,678	4,275	59,774,085	69	2,985,154	44	3,194,028	13	322,806	-	-	9,349	204,401,751
90-94	2,330	63,028,045	1,942	27,528,192	22	1,051,863	34	1,939,518	2	50,482	-	-	4,330	93,598,100
95-99	640	16,469,743	505	6,389,496	8	656,126	8	424,204	-	-	-	-	1,161	23,939,569
100-104	77	2,266,834	74	867,596	2	166,818	1	41,965	-	-	-	-	154	3,343,213
105-110+	7	229,136	3	18,201	-	-	-	-	-	-	-	-	10	247,337
	79,151	\$ 2,287,252,060	80,712	\$ 1,454,885,857	2,505	\$ 128,577,798	431	\$ 35,371,231	2,053	\$ 74,686,123	40	\$ 1,069,529	164,892	\$ 3,981,842,599

Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019.

Retired Membership* – By Calendar Year of Retirement

June 30, 2019

(State and Municipal)

Year of Retirement	Teachers'		Employees		State Police		Judges		LEOPS		CORS (Municipal)		Total	
	Number	Annual Benefits#	Number	Annual Benefits#	Number	Annual Benefits#	Number	Annual Benefits#	Number	Annual Benefits#	Number	Annual Benefits#	Annual Benefits	
Before 1989	3,664	\$ 102,719,415	3,238	\$ 52,465,631	405	\$ 16,443,835	38	\$ 1,724,407	-	-	-	-	7,345	\$ 173,353,287
1989	662	19,137,493	597	10,161,547	54	2,369,191	3	140,861	-	-	-	-	1,316	31,809,093
1990	689	20,688,680	649	10,625,381	41	1,813,772	10	645,575	8	\$ 193,673	-	-	1,397	33,967,080
1991	926	30,129,969	842	14,735,040	42	2,041,899	2	89,550	16	421,095	-	-	1,828	47,417,553
1992	1,375	46,547,687	996	16,581,750	93	4,532,802	6	297,859	18	569,478	-	-	2,488	68,529,576
1993	1,119	33,809,694	966	15,131,768	61	2,898,712	5	216,664	12	374,819	-	-	2,163	52,431,658
1994	1,236	34,933,205	1,061	16,255,439	69	3,283,098	6	456,991	11	336,258	-	-	2,383	55,264,992
1995	1,415	39,180,768	1,265	19,826,649	58	2,743,614	12	875,314	12	350,817	-	-	2,762	62,977,161
1996	1,598	45,917,947	2,280	41,786,274	75	3,557,841	13	870,646	14	417,858	-	-	3,980	92,550,566
1997	1,698	48,557,565	1,575	26,863,054	56	2,680,183	6	415,118	15	354,545	-	-	3,350	78,870,465
1998	1,887	56,568,927	1,453	21,242,543	56	2,713,189	10	661,592	23	535,265	-	-	3,429	81,721,516
1999	2,396	72,383,766	1,579	24,534,171	59	3,329,499	10	925,276	32	729,850	-	-	4,076	101,902,562
2000	2,367	69,995,846	1,730	25,672,743	133	7,456,370	11	995,621	72	2,192,132	-	-	4,313	106,312,712
2001	2,342	68,887,765	1,848	29,118,371	90	5,261,191	13	932,325	97	3,566,485	-	-	4,390	107,766,137
2002	2,489	71,344,247	2,107	33,361,948	84	5,149,665	15	1,164,578	86	3,185,197	-	-	4,781	114,205,634
2003	2,522	73,502,963	2,510	43,120,065	100	6,295,210	8	609,548	88	3,704,880	-	-	5,228	127,232,665
2004	2,897	85,366,425	2,870	51,193,201	95	5,496,597	13	1,145,274	79	3,059,853	-	-	5,954	146,261,351
2005	2,934	81,956,271	3,081	54,870,354	105	5,942,878	13	1,167,727	94	3,598,959	-	-	6,227	147,536,188
2006	2,609	73,121,860	2,787	49,088,909	82	4,454,131	15	1,298,828	83	3,116,684	-	-	5,576	131,080,412
2007	2,920	85,631,319	3,130	57,628,628	91	4,701,846	22	2,024,628	87	3,092,474	-	-	6,250	153,078,896
2008	3,007	85,413,995	3,294	59,226,965	78	3,984,247	13	1,220,523	97	3,661,832	-	-	6,489	153,507,562
2009	2,922	76,617,962	3,414	58,926,109	67	3,628,077	16	1,400,449	118	4,574,065	1	\$ 14,601	6,538	145,161,263
2010	3,430	101,603,637	3,987	75,579,075	74	4,540,578	16	1,445,253	97	3,833,105	6	201,668	7,610	187,203,315
2011	4,207	129,732,317	4,258	82,826,497	79	3,992,199	16	1,476,462	120	4,548,402	3	190,987	8,683	222,766,863
2012	3,565	101,483,996	3,590	63,101,781	51	2,710,975	13	1,338,685	116	4,364,158	3	104,215	7,338	173,103,810
2013	3,729	105,481,899	4,045	72,465,601	59	3,109,667	21	1,766,832	115	4,291,615	6	179,148	7,975	187,294,761
2014	3,804	106,390,364	3,607	62,054,505	42	2,197,856	16	1,618,193	82	2,873,100	6	97,204	7,557	175,231,222
2015	3,939	108,515,479	4,761	91,992,631	50	2,676,290	17	1,629,746	113	4,025,116	3	36,437	8,883	208,875,699
2016	3,593	100,362,123	3,972	74,139,031	42	2,085,126	16	1,507,341	100	3,725,690	3	43,753	7,726	181,863,065
2017	3,385	99,596,286	3,995	83,824,735	54	2,823,214	22	1,923,350	87	2,929,738	3	96,375	7,546	191,193,699
2018	3,152	95,886,433	3,646	81,173,163	40	2,435,154	27	2,687,787	120	4,862,681	2	48,132	6,987	187,093,351
2019	673	15,785,759	1,579	35,312,297	20	1,228,893	7	698,228	41	1,196,301	4	57,010	2,324	54,278,487
79,151	\$ 2,287,252,060	80,712	\$ 1,454,885,857	2,505	\$ 128,577,798	431	\$ 35,371,231	2,053	\$ 74,686,123	40	\$ 1,069,529	164,892	\$ 3,981,842,599	

* Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019.

APPENDIX C

SUMMARY OF PLAN PROVISIONS

This guide provides a general summary of certain features of the Maryland State Retirement and Pension System (“MSRPS”). The MSRPS is governed by law, including Division II of the State Personnel and Pensions Article of the Annotated Code of Maryland, and Title 22 of the Code of Maryland Regulations. If there is a conflict between the law and this guide, the law prevails.

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CITATIONS

All citations "SPP" are to the State Personnel and Pensions Article of the Annotated Code of Maryland.

Teachers' Retirement System of the State of Maryland

1. Membership

System closed to new members hired on or after January 1, 1980. Members on December 31, 1979 continue to be members unless they elected to transfer into the Teachers' Pension System (established January 1, 1980) prior to January 1, 2005.

Membership generally includes any teacher, helping teacher, principal, supervisor, superintendent, attendance officer or clerk employed in public day school within the State of Maryland, or supported and controlled by the State; any librarian or clerical employee of a library established or operated under the Education Article; any professional or clerical employee of a community college established or operated under the Education Article; or staff employee of the University System of Maryland, Morgan State University or St. Mary's College who is a member as of January 1, 1998.

2. Member Contributions

Retirement System members participate under one of three elections (effective July 1, 1984):

- Plan A: Generally, 7% of earnable compensation to maintain all benefits, including unlimited compounded cost-of-living adjustments.
- Plan B: Generally, 5% of earnable compensation to maintain all benefits, except the compounded cost-of-living adjustments which are capped at 5%.
- Plan C: 5% of earnable compensation as determined under the employee contribution for the Teachers' Pension System (Plan C provides a two-part benefit based on benefits of the Teachers' Retirement System and the Teachers' Pension System).

Interest earned on all employee contributions is 4% per year, compounded annually, until retirement, withdrawal of accumulated contributions, death, or the end of membership for former members who are not entitled to receive a vested allowance.

3. Normal Retirement Age

Normal retirement age is age 60.

4. Normal Service Retirement Allowance

Eligibility: 30 years of eligibility service or attainment of age 60.

Allowance: $1/55^{\text{th}}$ of average final compensation for the three highest years as a member for each year of creditable service. Creditable service is based on a full normal working time for teachers – 10 months equals one year.

Plan C: For creditable service before election date, the amount determined by the service retirement formula for Teachers' Retirement System; for creditable service after election date, the amount determined by the service retirement formula for the applicable component of the Teachers' Pension System.

Teachers' Retirement System of the State of Maryland

5. Early Retirement Allowance

Eligibility: 25 years of eligibility service and less than 60 years old.

Allowance: Service Retirement allowance reduced by 0.5% for each month that date of retirement precedes the earlier of age 60 or the date the member would have completed 30 years of eligibility service (maximum reduction of 30%).

Plan C: For creditable service before election date, the amount determined by the service retirement formula for Teachers' Retirement System (maximum reduction of 30%); for creditable service after election date, the amount determined by the service retirement formula for the applicable component of the Teachers' Pension System for each month retirement occurs prior to age 62 (maximum reduction of 42%).

6. Disability Retirement Allowance

Ordinary

Eligibility: Five years of eligibility service and certification of the medical board designated by the Board of Trustees that member is mentally or physically incapacitated from the performance of the normal duties of the member's position, and that incapacity is permanent.

Allowance: The benefit is 1/55th of average final compensation for the three highest years as a member for each year of creditable service. The minimum benefit is 25% of average final compensation; the maximum benefit can be no greater than 1/55th of average final compensation for each year of creditable service the member would have accrued if employment continued to age 60.

Plan C: The benefit is the greater of the Teachers' Retirement System allowance noted above, or the ordinary disability benefit of the Teachers' Pension System.

Accidental

Eligibility: Certification of the medical board designated by the Board of Trustees that member is totally and permanently incapacitated from the performance of the normal duties of the member's position as the natural and proximate result of an accident that occurred in the actual performance of duty at a definite time and place without willful negligence by the member.

Allowance: The benefit is 66.67% of average final compensation for the three highest years as a member, plus the annuity provided by accumulated member contributions. The maximum benefit cannot be greater than the average final compensation, including any annuitized accumulated contributions.

Teachers' Retirement System of the State of Maryland

7 Death Benefits

Ordinary Death Benefit for Active Member with Less Than One Year of Service

Eligibility: Less than one year of eligibility service and not eligible for a special death benefit

Benefit: Return of accumulated contributions

Ordinary Death Benefit for Active Member with One Or More Years of Service

Eligibility: One or more years of eligibility service and not eligible for a special death benefit

Benefit:

Members who at the time of death are younger than age 55 or have less than 15 years of service.
One-time lump sum payment of member's annual earnable compensation at time of death plus accumulated contributions to the member's designated beneficiary.

Members who at the time of death are eligible to retire and are age 55 or older with at least 15 years of service.

The surviving spouse of a deceased member may elect to receive: (1) a one-time lump sum payment of the member's annual earnable compensation at the time of death plus the member's accumulated contributions; or (2) a monthly allowance under Option 2 (100% survivor benefit). In cases where a deceased member is not survived by a spouse, the decedent's children may elect to receive: (1) a one-time lump sum payment of the member's annual earnable compensation at the time of death plus the member's accumulated contributions; or (2) an allowance equal to 50% of the basic allowance that would have been paid to the deceased member, prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. The annuity shall be reallocated among the remaining eligible children. If any child is disabled, the benefit will continue for that child as long as the child remains disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, the member's designated beneficiary shall receive a one-time lump sum payment consisting of the member's accumulated contributions and the member's annual compensation at the time of death.

Special Death Benefit for Active Member

Eligibility: Death arising out of or in the course of the actual performance of duty without willful negligence by the member.

Benefit: 66.67% of average final compensation for the three highest years as a member payable to a surviving spouse, decedent's children or dependent parents. Accumulated member contributions are paid to the designated beneficiary. Children of deceased members receiving a special death benefit will continue to receive this benefit, prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. The annuity shall be reallocated among the remaining eligible children. Disabled children receiving a special death benefit may receive a special death benefit as long as they remain disabled, regardless of age.

Teachers' Retirement System of the State of Maryland

Death Benefit for Vested Former Member

If member is not active, but is eligible for a vested allowance, the member's designated beneficiary or estate is eligible to receive only accumulated member contributions at time of death.

8. Vested Allowance

Eligibility: Five years of eligibility service and separation from employment other than by death or retirement.

Allowance: Vested allowance payable at normal retirement age, provided member does not withdraw accumulated contributions.

If member dies before payment of the vested allowance starts, only accumulated member contributions are returned.

9. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index (CPI). Any COLAs are effective July 1 for all allowances which have been in payment for one year.

- Selection A (Additional Member Contributions): Uncapped and compounded.
- Selection B (Limited COLA): Capped at 5% and compounded.
- Selection C (Combination Formula): For creditable service on or after the effective date of Selection C, generally, with limited exceptions, COLA is capped at 3% and compounded. For creditable service before the effective date of Selection C, COLA is calculated based on the applicable component (A or B) to which the member was subject prior to electing Section C.

In years in which COLAs would be less than zero due to a decline in the CPI, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

10. Optional Forms of Payment

Basic service allowance is a single life annuity.

- Option 1: Lump-sum refund equal to excess of present value of basic retirement allowance at date of retirement minus total amount of payments made to date of death excluding any cost of living adjustments for retirees before July 1, 2017.
- Option 2: 100% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 100% of the retiree's reduced allowance for the life of the designated beneficiary. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.
- Option 3: 50% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 50% of the retiree's reduced allowance for the life of the designated beneficiary.

Teachers' Retirement System of the State of Maryland

- Option 4: Lump-sum refund equal to value of accumulated member contributions minus total portion of monthly payments attributed to member contributions made to date of death, excluding any cost of living adjustments for retirees before July 1, 2017.
- Option 5: 100% "pop-up" joint and survivor annuity, which pays the designated beneficiary 100% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.
- Option 6: 50% "pop-up" joint and survivor annuity, which pays the designated beneficiary 50% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree.

Retirees who have selected Options 2, 3, 5, or 6 and change their designated beneficiary after they retire, will have their retirement allowance re-calculated to reflect the age of the new designated beneficiary. Retirees who elect to change their beneficiary under Options 2, 3, 5, and 6, may rescind their request to change their designated beneficiary before the second monthly allowance is paid. Retirees who rescind the change of beneficiary, will have their benefit payment amount for the next payment restored to the amount paid before the change in beneficiary was made.

Vested former members who are eligible to receive a vested allowance of less than \$50 a month may elect to receive a lump-sum payment equal to the present value in lieu of a monthly benefit.

11. Reduction for Benefits Payable under Workers' Compensation

Disability retirement allowances, excluding annuity reserves, are reduced for workers' compensation benefits paid or payable after retirement from injury occurring during employment by the State if the workers' compensation benefits are for the same injury for which disability retirement was granted and are paid or payable for the same period of time for which the retirement benefits are paid. Teachers' Retirement System retirees receiving an accidental disability payment are subject to an offset if they are getting a workers' compensation payment for the same injury or illness, subject to specified limits. Offsets do not include any calculation of cost-of-living benefits that are paid on the original benefit amount. Conversely, workers' compensation payments are subject to an offset by the Workers' Compensation Commission if a recipient is receiving an ordinary disability payment from the Teachers' Retirement System for the same injury or illness. Any offset taken for an accidental disability from the Teachers' Retirement System will be adjusted if the retiree was originally awarded an ordinary disability retirement benefit that was later converted to an accidental disability benefit. The adjusted offset shall reflect any offset awarded to the retiree's employer by the Workers' Compensation Commission.

Teachers' Pension System of the State of Maryland

1. Membership

Membership is generally a condition of employment for those teachers, faculty members, and educational employees, specified in SPP § 23-206 of the Annotated Code of Maryland, hired on or after January 1, 1980. Certain eligible higher education employees may elect to join an optional defined contribution retirement program provided by the State, known as the Optional Retirement Program (ORP). The ORP is separate and distinctive from the supplemental program administered by the Maryland Supplemental Retirement Plan.

All individuals who are members of the Teacher's Pension System on or before June 30, 2011, participate in the Alternate Contributory Pension Selection (ACPS) except for the members who transferred from the Teachers' Retirement System after April 1, 1998 or former vested members who terminated employment prior to July 1, 1998.

All individuals who enroll in the Teachers' Pension System on or after July 1, 2011, participate in the Reformed Contributory Pension Benefit (RCPB).

2. Member Contributions

Members of both the ACPS and the RCPB are required to make contributions of 7% of earnable compensation.

Contributions earn interest at 5% per year, compounded annually, until retirement, withdrawal of accumulated contributions, death, or the end of membership for former members who are not entitled to receive a vested allowance.

3. Normal Retirement Age

For members of the Alternate Contributory Pension Selection, normal retirement age is age 62.

For members of the Reformed Contributory Pension Benefit, normal retirement age is age 65.

4. Normal Service Retirement Allowance

ACPS Eligibility - 30 years of eligibility service or attainment of one of the following:

- Age 62 with five years of eligibility service.
- Age 63 with four years of eligibility service.
- Age 64 with three years of eligibility service.
- Age 65 and older with two years of eligibility service.

ACPS Allowance - The greater of (i) or (ii), plus (iii), as described below:

- (i) 1.2% of average final compensation for the three highest consecutive years as a member for each year of creditable service on or before June 30, 1998;

Teachers' Pension System of the State of Maryland

- (ii) 0.8% of average final compensation for the three highest consecutive years as a member up to the Social Security Integration Level (SSIL) plus 1.5% of average final compensation over the integration level for each year of creditable service on or before June 30, 1998;
- (iii) the number of years of the member's creditable service on or after July 1, 1998 multiplied by 1.8% of the member's average final compensation for the three highest consecutive years as a member.

RCPB Eligibility: Combined age and eligibility service of at least 90 years or age 65 after 10 years of eligibility service.

RCPB Allowance: 1.5% of average final compensation for the five highest consecutive years as a member for each year of creditable service on or after July 1, 2011.

The SSIL is the average of all Social Security Wage Bases over the 35 calendar years prior to your retirement.

Note: Members who transferred into the Teachers' Pension System, on or after April 1, 1998, receive benefits based on the provisions of the NCPS (refer to page C-28) in effect as of January 1, 1980, except for COLA benefits.

5. Early Retirement Allowance

ACPS Eligibility: Age 55 with at least 15 years of eligibility service.

ACPS Allowance: Service retirement allowance computed as of early retirement date, reduced by 0.5% for each month that early retirement date precedes age 62 (maximum reduction of 42%).

RCPB Eligibility: Age 60 with at least 15 years of eligibility service.

RCPB Allowance: Service retirement allowance computed as of early retirement date, reduced by 0.5% for each month that early retirement date precedes age 65 (maximum reduction of 30%).

6. Disability Retirement Allowance

Ordinary

Eligibility: Five years of eligibility service and certification of the medical board designated by the Board of Trustees that member is mentally or physically incapacitated from the performance of the normal duties of the member's position, and that incapacity is likely to be permanent.

Allowance: The benefit is the service retirement allowance computed on the basis that service continues until normal retirement age. If disability occurs after age 62 (age 65 for RCPB), the benefit is based on creditable service at time of retirement.

Teachers' Pension System of the State of Maryland

Accidental

Eligibility: Certification of the medical board designated by the Board of Trustees that member is totally and permanently incapacitated from the performance of the normal duties of the member's position as the natural and proximate result of an accident that occurred in the actual performance of duty without willful negligence by the member.

Allowance: The benefit is 66.67% of average final compensation for the three highest consecutive years (five highest for RCPB) as a member plus the annuity provided by accumulated member contributions. The maximum benefit cannot be greater than the average final compensation including any annuitized accumulated contributions.

7. Death Benefits

Ordinary Death Benefit for Active Member with Less Than One Year of Service

Eligibility: Less than one year of eligibility service and not eligible for a special death benefit.

Benefit: Return of accumulated contributions

Ordinary Death Benefit for Active Member with One Or More Years of Service

Eligibility: One or more years of eligibility service and not eligible for a special death benefit

Benefit:

Members who at the time of death are not members of the Reformed Contributory Pension Benefit, are younger than age 55 and have less than 15 years of service or are members of the Reformed Contributory Pension Benefit, are younger than age 60 and have less than 15 years of service.

One-time lump sum payment of member's annual earnable compensation at time of death plus accumulated contributions to the member's designated beneficiary.

Members who at the time of death: (1) are eligible to retire; (2) have accrued at least 25 years of eligibility service; (3) are not members of the Reformed Contributory Pension Benefit and are age 55 or older with at least 15 years of service; or (4) are members of the Reformed Contributory Pension Benefit and are age 60 or older with at least 15 years of service.

The surviving spouse of a deceased member may elect to receive: (1) a one-time lump sum payment of the member's annual earnable compensation at the time of death plus the member's accumulated contributions; or (2) a monthly allowance under Option 2 (100% survivor benefit). In cases where a deceased member is not survived by a spouse, the decedent's children may elect to receive: (1) a one-time lump sum payment of the member's annual earnable compensation at the time of death plus the member's accumulated contributions; or (2) an allowance equal to 50% of the basic allowance that would have been paid to the deceased member, prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. The annuity shall be reallocated among the remaining eligible children. If any child is disabled, the benefit will continue for that child as long as the child remains disabled, regardless of age. In cases where a deceased member is not

Teachers' Pension System of the State of Maryland

survived by a spouse or children, the member's designated beneficiary shall receive a one-time lump sum payment consisting of the member's accumulated contributions and the member's annual compensation at the time of death.

Special Death Benefit for Active Member

Eligibility: Death arising out of or in the course of the actual performance of duty without willful negligence by the member.

Benefit: 66.67% of average final compensation for the three highest consecutive years as a member, except for member's participating in the RCPB component for which the average final compensation is the five highest consecutive years as a member, payable to a surviving spouse, decedent's children or dependent parents. Accumulated contributions are paid to the designated beneficiary. Children of deceased members receiving a special death benefit will continue to receive this benefit prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. The annuity shall be reallocated among the remaining eligible children. Disabled children receiving a special death benefit may receive a special death benefit as long as they remain disabled, regardless of age.

Death Benefit for Vested Former Member

If a member is not active, but is eligible for a vested allowance, the member's designated beneficiary or estate is eligible to receive only accumulated member contributions at time of death.

8. Vested Allowance

ACPS Eligibility: Five years of eligibility service and separation from employment other than by death or retirement.

ACPS Allowance: Accrued retirement allowance payable at age 62 provided member does not withdraw accumulated contributions. A member who has completed 15 years of eligibility service may begin to receive benefit payments at any time on or after attainment of age 55, reduced by 0.5% for each month that benefit commencement date precedes age 62 (maximum reduction of 42%.)

If member dies before payment of the vested allowance starts, only accumulated member contributions are returned.

RCPB Eligibility: 10 years of eligibility service and separation from employment other than by death or retirement

RCPB Allowance: Accrued retirement allowance payable at age 65 provided member does not withdraw accumulated contributions. A member who has completed 15 years of eligibility service may begin to receive benefit payments at any time on or after attainment of age 60, reduced by 0.5% for each month that benefit commencement date precedes age 65 (maximum reduction of 30%.)

Teachers' Pension System of the State of Maryland

If member dies before payment of the vested allowance starts, only accumulated member contributions are returned.

9. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index (CPI). Effective July 1, 1998, and for an allowance based on creditable service before July 1, 2011, the adjustment is capped at a maximum of 3% compounded and is applied to all allowances which have been in payment for one year.

For an allowance based on creditable service earned on or after July 1, 2011, the COLA adjustment is capped at 2.5% if, for the calendar year ending December 31 in the previous fiscal year, the several systems' total investment performance was greater than or equal to the assumed rate of investment return established by the Board of Trustees and in effect as of December 31 of the preceding fiscal year. The adjustment is capped at 1% if, for the calendar year ending December 31 in the previous fiscal year, the several systems' total investment performance was less than the assumed rate of investment return established by the Board of Trustees and in effect as of December 31 of the preceding fiscal year.

In years in which COLAs would be less than zero due to a decline in the CPI, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

Any adjustments are effective July 1.

10. Optional Forms of Payment

Basic service allowance is a single life annuity.

- Option 1: Lump-sum refund equal to excess of present value of basic retirement allowance at date of retirement minus total amount of payments made to date of death excluding any cost of living adjustments for retirees before July 1, 2017.
- Option 2: 100% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 100% of the retiree's reduced allowance for the life of the designated beneficiary. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.
- Option 3: 50% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 50% of the retiree's reduced allowance for the life of the designated beneficiary.
- Option 4: Lump-sum refund equal to value of accumulated member contributions minus total portion of monthly payments attributed to member contributions made to date of death, excluding any cost of living adjustments for retirees before July 1, 2017.

Teachers' Pension System of the State of Maryland

- Option 5: 100% "pop-up" joint and survivor annuity, which pays the designated beneficiary 100% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.
- Option 6: 50% "pop-up" joint and survivor annuity, which pays the designated beneficiary 50% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree.

Retirees who have selected Options 2, 3, 5, or 6 and change their designated beneficiary after they retire, will have their retirement allowance re-calculated to reflect the age of the new designated beneficiary. Retirees who elect to change their beneficiary under Options 2, 3, 5, and 6, may rescind their request to change their designated beneficiary before the second monthly allowance is paid. Retirees who rescind the change of beneficiary, will have their benefit payment amount for the next payment restored to the amount paid before the change in beneficiary was made.

Vested former members who are eligible to receive a vested allowance of less than \$50 a month may elect to receive a lump-sum payment equal to the present value in lieu of a monthly benefit.

11. Reduction for Benefits Payable under Workers' Compensation

Disability retirement allowances, excluding annuity reserves, are reduced for workers' compensation benefits paid or payable after retirement from injury occurring during employment by the State if the workers' compensation benefits are for the same injury for which disability retirement was granted and are paid or payable for the same period of time for which the retirement benefits are paid. Teachers' Pension System retirees receiving an accidental disability payment are subject to an offset if they are getting a workers' compensation payment for the same injury or illness, subject to specified limits. Offsets do not include any calculation of cost-of-living benefits that are paid on the original benefit amount. Conversely, workers' compensation payments are subject to an offset by the Workers' Compensation Commission if a recipient is receiving an ordinary disability payment from the Teachers' Pension System for the same injury or illness. Any offset taken for an accidental disability from the Teachers' Pension System will be adjusted if the retiree was originally awarded an ordinary disability retirement benefit that was later converted to an accidental disability benefit. The adjusted offset shall reflect any offset awarded to the retiree's employer by the Workers' Compensation Commission.

Employees' Retirement System of the State of Maryland

1. Membership

System closed to new members hired on or after January 1, 1980. Members on December 31, 1979 continue to be members unless they elected to transfer into the Employees' Pension System (established January 1, 1980) prior to January 1, 2005.

Membership generally includes employees of the State and other eligible participating employers.

2. Member Contributions

- Plan A: Generally, 7% of earnable compensation to maintain all benefits, including unlimited compounded cost-of-living adjustments.
- Plan B: Generally, 5% of earnable compensation to maintain all benefits, except the compounded cost-of-living adjustments which are capped at 5%.
- Plan C: Provides a two-part benefit based on benefits of the Employees' Retirement System and the Employees' Pension System. Employee contributions, if any, are based on participation of the employer in the applicable component of the Employees' Pension System. (refer to summary of Employees' Pension System).

Interest earned on all employee contributions is 4% per year, compounded annually, until retirement, withdrawal of accumulated contributions, death, or the end of membership for former members who are not entitled to receive a vested allowance.

3. Normal Retirement Age

Normal retirement age is age 60.

4. Normal Service Retirement Allowance

Eligibility: 30 years of eligibility service or attainment of age 60.

Allowance: 1/55th of average final compensation for the three highest years as a member for each year of creditable service.

Plan C: For creditable service before election date, the amount determined by the service retirement formula for Employees' Retirement System; for creditable service after election date, the amount determined by the service retirement formula for the applicable component of the Employees' - Pension System under which the employer and member participates.

5. Early Retirement Allowance

Eligibility: 25 years of eligibility service and less than 60 years old.

Employees' Retirement System of the State of Maryland

Allowance: Service retirement allowance reduced by 0.5% for each month that date of retirement precedes the earlier of age 60 or the date the member would have completed 30 years of eligibility service (maximum reduction of 30%).

Plan C: For creditable service before election date, the amount determined by the service retirement formula for Employees' Retirement System with a maximum reduction of 30%; for creditable service after election date, the amount determined by the service retirement formula for the applicable component of the Employees' Pension System under which the employer participates with a 0.5% reduction for each month retirement occurs prior to age 62 (maximum reduction of 42%).

6. Disability Retirement Allowance

Ordinary

Eligibility: Five years of eligibility service and certification of the medical board designated by the Board of Trustees that member is mentally or physically incapacitated from the performance of the normal duties of the member's position, and that incapacity is permanent.

Allowance: The benefit is $1/55^{\text{th}}$ of average final compensation for the three highest years as a member for each year of creditable service. The minimum benefit is 25% of average final compensation; the maximum benefit can be no greater than $1/55^{\text{th}}$ of average final compensation for each year of creditable service the member would have accrued if employment continued to age 60.

Plan C: The benefit is the greater of the Employees' Retirement System allowance noted above, or the ordinary disability benefit of the Employees' Pension System.

Accidental

Eligibility: Certification of the medical board designated by the Board of Trustees that member is totally and permanently incapacitated from the performance of the normal duties of the member's position as the natural and proximate result of an accident that occurred in the actual performance of duty at a definite time and place without willful negligence by the member.

Allowance: The benefit is 66.67% of average final compensation for the three highest years as a member, plus the annuity provided by accumulated member contributions. The maximum benefit cannot be greater than the average final compensation, including any annuitized accumulated contributions.

7. Death Benefits

Ordinary Death Benefit for Active Member with Less Than One Year of Service

Eligibility: Less than one year of eligibility service and not eligible for a special death benefit.

Employees' Retirement System of the State of Maryland

Benefit: Return of accumulated contributions

Ordinary Death Benefit for Active Member with One or More Years of Service

Eligibility: One or more years of eligibility service and not eligible for a special death benefit.

Benefit:

Members who at the time of death are younger than age 55 or have less than 15 years of service.

One-time lump sum payment of member's annual earnable compensation at time of death plus accumulated contributions to the member's designated beneficiary.

Members who at the time of death are eligible to retire and are age 55 or older with at least 15 years of service.

The surviving spouse of a deceased member may elect to receive: (1) a one-time lump sum payment of the member's annual earnable compensation at the time of death plus the member's accumulated contributions; or (2) a monthly allowance under Option 2 (100% survivor benefit). In cases where a deceased member is not survived by a spouse, the decedent's children may elect to receive: (1) a one-time lump sum payment of the member's annual earnable compensation at the time of death plus the member's accumulated contributions; or (2) an allowance equal to 50% of the basic allowance that would have been paid to the deceased member, prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. The annuity shall be reallocated among the remaining eligible children. If any child is disabled, the benefit will continue for that child as long as the child remains disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, the member's designated beneficiary shall receive a one-time lump sum payment consisting of the member's accumulated contributions and the member's annual compensation at the time of death.

Special Death Benefit for Active Member

Eligibility: Death arising out of or in the course of the actual performance of duty without willful negligence by the member.

Benefit: 66.67% of average final compensation for the three highest years as a member payable to a surviving spouse, decedent's children or dependent parents. Accumulated member contributions are paid to the designated beneficiary. Children of deceased members receiving a special death benefit will continue to receive this benefit, prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. The annuity shall be reallocated among the remaining eligible children. Disabled children receiving a special death benefit may receive a special death benefit as long as they remain disabled, regardless of age.

Death Benefit for Vested Former Member

If member is not active, but is eligible for a vested allowance, the member's designated beneficiary or estate is eligible to receive only accumulated member contributions at time of death.

Employees' Retirement System of the State of Maryland

8. Vested Allowance

Eligibility: Five years of eligibility service and separation from employment other than by death or retirement.

Allowance: Vested allowance payable at normal retirement age, provided member does not withdraw accumulated member contributions.

9. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index (CPI). Any COLAs are effective July 1 for all allowances which have been in payment for one year.

- Selection A (Additional Member Contributions): Uncapped and compounded.
- Selection B (Limited COLA): Capped at 5% and compounded.
- Selection C (Combination Formula): For creditable service on or after the effective date of Selection C, generally, with limited exceptions, COLA is capped at 3% and compounded. For creditable service before the effective date of Selection C, COLA is calculated based on the applicable component (A or B) to which the member was subject prior to electing Selection C.

In years in which COLAs would be less than zero due to a decline in the CPI, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

10. Optional Forms of Payment

Basic service allowance is a single life annuity.

Option 1: Lump-sum refund equal to excess of present value of basic retirement allowance at date of retirement minus total amount of payments made to date of death excluding any cost of living adjustments for retirees before July 1, 2017.

Option 2: 100% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 100% of the retiree's reduced allowance for the life of the designated beneficiary. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.

Option 3: 50% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 50% of the retiree's reduced allowance for the life of the designated beneficiary.

Option 4: Lump-sum refund equal to value of accumulated member contributions minus total portion of monthly payments attributed to member contributions made to date of death, excluding any cost of living adjustments for retirees before July 1, 2017.

Employees' Retirement System of the State of Maryland

- Option 5: 100% “pop-up” joint and survivor annuity, which pays the designated beneficiary 100% of the retiree’s reduced allowance after the retiree’s death or returns the retiree’s benefit to the unreduced basic allowance if beneficiary predeceases retiree. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree’s spouse or disabled child.
- Option 6: 50% “pop-up” joint and survivor annuity, which pays the designated beneficiary 50% of the retiree’s reduced allowance after the retiree’s death or returns the retiree’s benefit to the unreduced basic allowance if beneficiary predeceases retiree.

Retirees who have selected Options 2, 3, 5, or 6 and change their designated beneficiary after they retire, will have their retirement allowance re-calculated to reflect the age of the new designated beneficiary. Retirees who elect to change their beneficiary under Options 2, 3, 5, and 6, may rescind their request to change their designated beneficiary before the second monthly allowance is paid. Retirees who rescind the change of beneficiary, will have their benefit payment amount for the next payment restored to the amount paid before the change in beneficiary was made.

Vested former members who are eligible to receive a vested allowance of less than \$50 a month may elect to receive a lump-sum payment equal to the present value in lieu of a monthly benefit.

11. Reduction for Benefits Payable Under Workers’ Compensation

Disability retirement allowances, excluding annuity reserves, are reduced for workers’ compensation benefits paid or payable after retirement from injury occurring during employment by the State if the workers’ compensation benefits are for the same injury for which disability retirement was granted and are paid or payable for the same period of time for which the retirement benefits are paid. Employees’ Retirement System retirees receiving an accidental disability payment are subject to an offset if they are getting a workers’ compensation payment for the same injury or illness, subject to specified limits. Offsets do not include any calculation of cost-of-living benefits that are paid on the original benefit amount. Conversely, workers’ compensation payments are subject to an offset by the Workers’ Compensation Commission if a recipient is receiving an ordinary disability payment from the Employees’ Retirement System for the same injury or illness. Any offset taken for an accidental disability from the Employees’ Retirement System will be adjusted if the retiree was originally awarded an ordinary disability retirement benefit that was later converted to an accidental disability benefit. The adjusted offset shall reflect any offset awarded to the retiree’s employer by the Workers’ Compensation Commission.

Correctional Officers Retirement System

1. Membership

Membership is generally a condition of employment for correctional officers serving in the first six job classifications, individuals serving as a security chief, a facility administrator, and assistant warden or a warden, maximum security attendants at Clifton T. Perkins Hospital Center, and employees of the State as provided in SPP § 25-201. This includes participating governmental units who elect to have their detention center officers participate in the Correctional Officers' Retirement System.

2. Member Contributions

Members are required to make contributions of 5% of earnable compensation.

Interest earned on all employee contributions is 4% per year, compounded annually, until retirement, withdrawal of accumulated contributions, death, or the end of membership for former members who are not entitled to receive a vested allowance.

3. Normal Retirement Age

Normal retirement age is age 55 for service retirement, age 60 for disability retirement.

4. Normal Service Retirement Allowance

Eligibility: For individuals who are members on or before June 30, 2011, either age 55 with at least 5 years of eligibility service credit or 20 years of eligibility service, regardless of age. For individuals who are members on or after July 1, 2011, either age 55 with at least 10 years of eligibility service credit, or 20 years of eligibility service, regardless of age.

Allowance: For individuals who are members on or before June 30, 2011, 1/55th of average final compensation for the three highest years as a member for each year of creditable service. For individuals who are members on or after July 1, 2011, 1/55th of average final compensation for the five highest years as a member for each year of creditable service.

5. Early Retirement Allowance

Not applicable to the Correctional Officers' Retirement System, except for certain Baltimore City Jail employees who may retire with 10 years of creditable service., as specified in SPP § 25-401.1.

6. Disability Retirement Allowance

Ordinary

Eligibility: Five years of eligibility service and certification of the medical board designated by the Board of Trustees that member is mentally or physically incapacitated from the performance of the normal duties of the member's position, and that incapacity is likely to be permanent.

Correctional Officers Retirement System

Allowance: The benefit is 1/55th of the average final compensation for the three highest years as a member (five highest for members enrolled on or after July 1, 2011). The minimum benefit is 25% of average final compensation; the maximum benefit can be no greater than 1/55th of average final compensation for each year of creditable service the member would have accrued if employment continued to age 60.

Accidental

Eligibility: Certification of the medical board designated by the Board of Trustees that member is totally and permanently incapacitated from the performance of the normal duties of the member's position as the natural and proximate result of an accident that occurred in the actual performance of duty at a definite time and place without willful negligence by the member.

Allowance: The benefit is 66.67% of average final compensation for the three highest years as a member (five highest for members enrolled on or after July 1, 2011), plus the annuity provided by accumulated member contributions. The maximum benefit cannot be greater than the average final compensation, including any annuitized accumulated contributions.

7. Death Benefits

Ordinary Death Benefit for Active Member with Less Than One Year of Service

Eligibility: Less than one year of eligibility service and not eligible for a special death benefit.

Benefit: Return of accumulated contributions

Ordinary Death Benefit for Active Members with One Or More Years of Service

Eligibility: One or more years of eligibility service and not eligible for a special death benefit.

Benefit:

Members who at the time of death are younger than age 55 or have less than 15 years of service

One-time lump sum payment of member's annual earnable compensation at time of death plus accumulated contributions to the member's designated beneficiary.

Members who at the time of death are eligible to retire and are age 55 or older with at least 15 years of service

The surviving spouse of a deceased member may elect to receive: (1) a one-time lump sum payment of the member's annual earnable compensation at the time of death plus the member's accumulated contributions; or (2) a monthly allowance under Option 2 (100% survivor benefit). In cases where a deceased member is not survived by a spouse, the decedent's children may elect to receive: (1) a one-time lump sum payment of the member's annual earnable compensation at the time of death plus the member's accumulated contributions; or (2) an allowance equal to 50% of the basic allowance that would have been paid to the deceased member, prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. The annuity shall be reallocated

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among the remaining eligible children. If any child is disabled, the benefit will continue for that child past age 26 as long as the child remains disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, the member's designated beneficiary shall receive a one-time lump sum payment consisting of the member's accumulated contributions and the member's annual compensation at the time of death.

Special Death Benefit for Active Member

Eligibility: Death arising out of or in the course of the actual performance of duty without willful negligence by the member.

Benefit: 66.67% of average final compensation for the three highest years as a member payable to a surviving spouse, the decedent's children or dependent parents. Accumulated member contributions are paid to the designated beneficiary. Children of deceased members receiving a special death benefit will continue to receive this benefit, prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. The annuity shall be reallocated among the remaining eligible children. Disabled children receiving a special death benefit may receive a special death benefit as long as they remain disabled, regardless of age.

Death Benefit for Vested Former Member

If member is not active, but is eligible for a vested allowance, the member's designated beneficiary or estate is eligible to receive only accumulated member contributions at time of death.

8. Vested Allowance

Eligibility: For individuals who are members on or before June 30, 2011, five years of eligibility service. For individuals who become member on or after July 1, 2011, 10 years of eligibility service. Member must also be separated from employment other than by death or retirement.

Allowance: Service retirement allowance payable at age 55 provided the member does not withdraw the member's accumulated contributions.

9. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index (CPI). Any COLAs are effective July 1 for all allowances which have been in payment for one year.

Uncapped compounded COLAs are applied to all benefits attributable to creditable service earned on or before June 30, 2011.

For an allowance based on creditable service earned on or after July 1, 2011, the COLA is capped at 2.5% if, for the calendar year ending December 31 in the previous fiscal year the several systems' total investment performance was greater than or equal to the assumed rate of investment return established by the Board of Trustees and in effect as of December 31 of the preceding fiscal year. The adjustment is capped at 1% if, for the calendar year ending December 31 in the previous fiscal year, the several systems' total investment performance was less than the assumed rate of investment

Correctional Officers Retirement System

return established by the Board of Trustees and in effect as of December 31 of the preceding fiscal year.

In years in which COLAs would be less than zero due to a decline in the CPI, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

10. Optional Forms of Payment

Basic service allowance is a single life annuity.

Option 1: Lump-sum refund equal to excess of present value of basic retirement allowance at date of retirement minus total amount of payments made to date of death excluding any cost of living adjustments for retirees before July 1, 2017.

Option 2: 100% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 100% of the retiree's reduced allowance for the life of the designated beneficiary. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.

Option 3: 50% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 50% of the retiree's reduced allowance for the life of the designated beneficiary.

Option 4: Lump-sum refund equal to value of accumulated member contributions minus total portion of monthly payments attributed to member contributions made to date of death, excluding any cost of living adjustments for retirees before July 1, 2017.

Option 5: 100% "pop-up" joint and survivor annuity, which pays the designated beneficiary 100% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.

Option 6: 50% "pop-up" joint and survivor annuity, which pays the designated beneficiary 50% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree.

Retirees who have selected Options 2, 3, 5, or 6 and change their designated beneficiary after they retire, will have their retirement allowance re-calculated to reflect the age of the new designated beneficiary. Retirees who elect to change their beneficiary under Options 2, 3, 5, and 6, may rescind their request to change their designated beneficiary before the second monthly allowance is paid. Retirees who rescind the change of beneficiary, will have their benefit payment amount for the next payment restored to the amount paid before the change in beneficiary was made.

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Vested former members who are eligible to receive a vested allowance of less than \$50 a month may elect to receive a lump-sum payment equal to the present value in lieu of a monthly benefit.

11. Reduction for Benefits Payable Under Workers' Compensation

Disability retirement allowances, excluding annuity reserves, are reduced for workers' compensation benefits paid or payable after retirement from injury occurring during employment by the State if the workers' compensation benefits are for the same injury for which disability retirement was granted and are paid or payable for the same period of time for which the retirement benefits are paid. Correctional Officers' Retirement System retirees receiving an accidental disability payment are subject to an offset if they are getting a workers' compensation payment for the same injury or illness, subject to specified limits. Offsets do not include any calculation of cost-of-living benefits that are paid on the original benefit amount. Conversely, workers' compensation payments are subject to an offset by the Workers' Compensation Commission if a recipient is receiving an ordinary disability payment from the Correctional Officers' Retirement System for the same injury or illness. Any offset taken for an accidental disability from the Correctional Officers' Retirement System will be adjusted if the retiree was originally awarded an ordinary disability retirement benefit that was later converted to an accidental disability benefit. The adjusted offset shall reflect any offset awarded to the retiree's employer by the Workers' Compensation Commission.

Legislative Pension Plan

1. Membership

Membership is generally a condition of employment for members of the Maryland General Assembly during the 2019-2022 term of office.

2. Member Contributions

Members are required to contribute 7% of annual salary up to 22 years and three months of creditable service.

Interest earned on all employee contributions is 4% per year, compounded annually, until retirement or withdrawal of accumulated contributions.

3. Normal Retirement Age

For members who have creditable service prior to January 14, 2015, normal retirement age is age 60.

For members who do not have creditable service prior to January 14, 2015, normal retirement age is age 62.

4. Service Retirement Allowance

Eligibility: For individuals who have creditable service in the Legislative Pension Plan before January 14, 2015, age 60 with eight years of creditable service. For individuals who have no creditable service in the Legislative Pension Plan before January 14, 2015, age 62 with eight years of creditable service.

Allowance: 3% of salary of an active legislator for each year of service, multiplied by the number of years of creditable service. The maximum benefit available for a member is 66.67% of salary payable to an active legislator.

5. Reduced Service Retirement Allowance

Eligibility: For individuals who have creditable service in the Legislative Pension Plan before January 14, 2015, age 50 with eight years of creditable service. For individuals who have no creditable service in the Legislative Pension Plan before January 14, 2015, age 55 with eight years of creditable service.

Allowance: For individuals who have creditable service in the Legislative Pension Plan before January 14, 2015, a service retirement allowance computed as of early retirement date, reduced by 0.5% for each month under age 60 (maximum reduction of 60%). For individuals who have no creditable service in the Legislative Pension Plan before January 14, 2015, a service retirement allowance computed as of early retirement date, reduced by 0.5% for each month under age 62 (maximum reduction of 42%).

Legislative Pension Plan

6. Disability Retirement Allowance

Eligibility: Eight years of creditable service, regardless of age, and certification of the medical board designated by the Board of Trustees that the member is mentally or physically incapacitated from further performance of duty as a legislator, and that incapacity is likely to be permanent.

Allowance: Service retirement allowance, regardless of age.

7. Death Benefits

Death of A Member With At Least Eight Years of Creditable Service

Eligibility: At least eight years of creditable service

Beneficiary: Payment of the benefit shall be made to the member's surviving spouse. If there is no surviving spouse at the time of the member's death, the benefit shall be prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. If any child is disabled, the benefit will continue as long as the child remains disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, payment will be made to the member's designated beneficiary.

Benefit: The member's beneficiary (surviving spouse, children, or designated beneficiary) may elect to receive: (1) a return of the member's accumulated contributions plus the member's annual salary, if any, at the time of death; or (2) an annuity equal to 50% of the retirement allowance that would have been paid at the member's death, regardless of the member's age. The surviving spouse or children will begin receiving the death benefit at the time of the member's death. A designated beneficiary who elects to receive the annuity may not begin receiving the benefit until the beneficiary reaches age 60, if the deceased member had creditable service in the Legislative Pension Plan before January 14, 2015, or age 62, if the deceased member did not have creditable service before January 14, 2015. The designated beneficiary may elect to begin receiving a reduced annuity at age 50, if the deceased member had creditable service before January 14, 2015, or age 55 if the deceased member did not have creditable service before January 14, 2015.

Death of A Member with Less Than Eight Years of Creditable Service

Eligibility: A member currently serving in the legislature with less than eight years of creditable service

Beneficiary: Payment of the benefit shall be made to the member's surviving spouse. If there is no surviving spouse at the time of the member's death, the benefit shall be prorated equally among the eligible children. A child is eligible for a prorated share if the child is under age 26 or the child is disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, payment will be made to the member's designated beneficiary. If a member designates more than one beneficiary, the benefit shall be prorated equally among each beneficiary.

Legislative Pension Plan

Benefit: A lump-sum benefit equal to the member's accumulated contributions plus the member's annual salary at the time of death.

Death of A Member with No Beneficiary

On death of a member who is not survived by a spouse, children, or designated beneficiary, the Board of Trustees shall pay the member's accumulated contributions to the estate of the member.

Death of Retiree

Upon the death of a retiree, a survivor allowance equal to 50% of the retiree's retirement allowance is payable to the retiree's surviving spouse for the spouse's life. If the retiree has no surviving spouse and the retiree has creditable service before January 14, 2015, the full survivor allowance is payable to the designated beneficiary for life beginning at age 60 or an optional reduced survivor allowance is payable to the designated beneficiary for life beginning at age 50. If the retiree has no surviving spouse and the retiree has no creditable service before January 14, 2015, the full survivor allowance is payable to the designated beneficiary for life beginning at age 62 or an optional reduced survivor allowance is payable to the designated beneficiary for life beginning at age 55.

8. Vested Allowance

Eligibility: Eight years of creditable service and separation from employment other than by death or retirement.

Allowance: For individuals who have creditable service in the Legislative Pension Plan before January 14, 2015, a service retirement allowance payable at age 60, provided the member has not withdrawn the member's accumulated contributions. For individuals who have no creditable service in the Legislative Pension Plan before January 14, 2015, a service retirement allowance payable at age 62, provided the member has not withdrawn the member's accumulated contributions.

9. Cost-of-Living Adjustments

Generally, allowances are recalculated each time the salary for a sitting legislator increases.

10. Optional Forms of Payment

Basic Allowance: Normal service allowance with a 50% joint and survivor annuity to the retiree's surviving spouse. If there is no surviving spouse, to the retiree's designated beneficiary. A surviving spouse will begin receiving the death benefit at the time of the retiree's death. A designated beneficiary may not begin receiving the benefit until the beneficiary reaches age 60, if the deceased retiree had creditable service in the Legislative Pension Plan before January 14, 2015, or age 62, if the deceased retiree did not have creditable service before January 14, 2015. The designated beneficiary may elect to begin receiving a reduced annuity at age 50, if the deceased retiree had creditable service before January 14, 2015, or age 55 if the deceased retiree did not have creditable service before January 14, 2015.

Legislative Pension Plan

Option 1: 100% joint and survivor annuity. If, at the time of retirement the member is married and elects to receive Option 1, the member's spouse must be the designated beneficiary. The designated beneficiary may not be more than 10 years younger than the member unless the beneficiary is the member's spouse or disabled child.

Employees' Pension System of the State of Maryland

1. Membership

Membership is generally a condition of employment for all regular employees of the State of Maryland hired on or after January 1, 1980, excluding those eligible for the Teachers' Retirement System, Teachers' Pension System, State Police Retirement System, certain judges, correctional officers, Law Enforcement Officers Pension System, and members of the General Assembly. Certain governmental units also have elected to participate in the System.

There are four plans under the Employees' Pension System.

- Noncontributory Pension System (**NCPS**) - The original pension system established on January 1, 1980 that only applies to certain participating governmental units that did not elect to participate in the Contributory Pension System, Alternate Contributory Pension Selection, or Reformed Contributory Pension Benefit.
- Employees' Contributory Pension System (**ECPS**) – The ECPS established July 1, 1998 that only applies to certain participating governmental units that elected the ECPS but did not elect to participate in the Alternate Contributory Pension Selection, or Reformed Contributory Pension Benefit.
- Alternate Contributory Pension Selection (**ACPS**) - Applies to all State employees and employees of participating governmental units that are members of the ACPS on or before June 30, 2011.
- Reformed Contributory Pension Benefit (**RCPB**) – Applies to all State employees and employees of participating governmental units enrolling in the Employees' Pension System on or after July 1, 2011. It does not apply to employees of participating governmental units that did not elect to participate in the ACPS or RCPB.

2. Member Contributions

NCPS: Members are only required to make contributions of 5% on earnable compensation that exceeds the Social Security Taxable Wage Base.

ECPS: Members are required to make contributions of 2% of earnable compensation.

ACPS: Members are required to make contributions of 7% of earnable compensation.

RCPB: Members are required to make contributions of 7% of earnable compensation.

Contributions earn interest at 5% per year, compounded annually, until retirement, withdrawal of accumulated contributions, death, or the end of membership for former members who are not entitled to receive a vested allowance.

Employees' Pension System of the State of Maryland

3. Normal Retirement Age

For members of the Non-Contributory, Contributory, or Alternate Contributory Pension Selection, normal retirement age is age 62.

For members of the Reformed Contributory Pension Benefit, normal retirement age is age 65.

4. Normal Service Retirement Allowance

NCPS, ECPS, and ACPS Eligibility - 30 years of eligibility service or attainment of one of the following:

- Age 62 with five years of eligibility service
- Age 63 with four years of eligibility service
- Age 64 with three years of eligibility service
- Age 65 or older with two years of eligibility service

NCPS Allowance:

0.8% of average final compensation up to the Social Security Integration Level (SSIL) for the three highest consecutive years as a member plus 1.5% of average final compensation over the SSIL for each year of creditable service;

ECPS Allowance: The greater of (i) or (ii), plus (iii), as described below:

- (i) 1.2% of average final compensation for the three highest consecutive years as a member for each year of creditable service on or before June 30, 1998;
- (ii) 0.8% of average final compensation up to the SSIL for the three highest consecutive years as a member plus 1.5% of average final compensation over the SSIL for each year of creditable service on or before June 30, 1998;
- (iii) 1.4% of average final compensation for the three highest consecutive years as a member for each year of creditable service after June 30, 1998.

ACPS Allowance: The greater of (i) or (ii), plus (iii), as described below:

- (i) 1.2% of average final compensation for the three highest consecutive years as a member for each year of creditable service on or before June 30, 1998;
- (ii) 0.8% of average final compensation up to the SSIL for the three highest consecutive years as a member plus 1.5% of average final compensation over the SSIL for each year of creditable service on or before June 30, 1998;
- (iii) 1.8% of average final compensation for the three highest consecutive years as a member for each year of creditable service after June 30, 1998.

Employees' Pension System of the State of Maryland

RCPB Eligibility - Combined age and eligibility service of at least 90 years or age 65 with 10 or more years of eligibility service.

RCPB Allowance: 1.5% of average final compensation for the five highest consecutive years as a member for each year of creditable service on or after July 1, 2011.

SSIL is the average of all Social Security Wage Bases over the 35 calendar years prior to your retirement.

Note: Members who transferred into the Employees' Pension System, on or after April 1, 1998, receive benefits based on the provisions of the NCPS as in effect on January 1, 1980 except for COLA benefits.

5. Early Retirement Allowance

NCPS, ECPS, and ACPS Eligibility: Age 55 and at least 15 years of eligibility service.

NCPS, ECPS, and ACPS Allowance: Service retirement allowance computed as of early retirement date, reduced by 0.5% for each month that early retirement date precedes age 62 (maximum reduction is 42%).

RCPB Eligibility: Age 60 with at least 15 years of eligibility service.

RCPB Allowance: Service retirement allowance computed as of early retirement date, reduced by 0.5% for each month that early retirement date precedes age 65 (maximum reduction is 30%).

6. Disability Retirement Allowance

Ordinary

Eligibility: Five years of eligibility service and certification of the medical board designated by the Board of Trustees that member is mentally or physically incapacitated from the performance of the normal duties of the member's position, and that incapacity is likely to be permanent.

Allowance: The benefit is the service retirement allowance computed on the basis that service continues until normal retirement age. If disability occurs on or after age 62 (age 65 for RCPB), the benefit is based on creditable service at time of retirement.

Accidental

Eligibility: Certification of the medical board designated by the Board of Trustees that member is totally and permanently incapacitated from the performance of the normal duties of the member's position as the natural and proximate result of an accident that occurred in the actual performance of duty without willful negligence by the member.

Employees' Pension System of the State of Maryland

Allowance: The benefit is 66.67% of average final compensation for the three highest consecutive years (five highest for RCPB) as a member, plus the annuity provided by accumulated member contributions. The maximum benefit cannot be greater than the average final compensation including any annuitized accumulated contributions.

7. Death Benefits

Ordinary Death Benefit for Active Member with Less Than One Year of Service

Eligibility: Less than one year of eligibility service and not eligible for a special death benefit.

Benefit: Return of accumulated contributions

Ordinary Death Benefit for Active Member with One Or More Years of Service

Eligibility: One or more years of eligibility service and not eligible for a special death benefit.

Benefit:

Members who at the time of death are not members of the Reformed Contributory Pension Benefit, are younger than age 55, and have less than 15 years of service or are members of the Reformed Contributory Pension Benefit, are younger than age 60, and have less than 15 years of service.

One-time lump sum payment of member's annual earnable compensation at time of death plus accumulated contributions to the member's designated beneficiary.

Members who at the time of death: (1) are eligible to retire; (2) have accrued at least 25 years of eligibility service; (3) are not members of the Reformed Contributory Pension Benefit and are age 55 or older with at least 15 years of service; or (4) are members of the Reformed Contributory Pension Benefit and are age 60 or older with at least 15 years of service.

The surviving spouse of a deceased member may elect to receive: (1) a one-time lump sum payment of the member's annual earnable compensation at the time of death plus the member's accumulated contributions; or (2) a monthly allowance under Option 2 (100% survivor benefit). In cases where a deceased member is not survived by a spouse, the decedent's children may elect to receive: (1) a one-time lump sum payment of the member's annual earnable compensation at the time of death plus the member's accumulated contributions; or (2) an allowance equal to 50% of the basic allowance that would have been paid to the deceased member, prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. The annuity shall be reallocated among the remaining eligible children. If any child is disabled, the benefit will continue for that child as long as the child remains disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, the member's designated beneficiary shall receive a one-time lump sum payment consisting of the member's accumulated contributions and the member's annual compensation at the time of death.

Special Death Benefit for Active Member

Eligibility: Death arising out of or in the course of the actual performance of duty without willful negligence by the member.

Employees' Pension System of the State of Maryland

Benefit: 66.67% of average final compensation for the three highest consecutive years as a member, except for member's participating in the RCPB component for which the average final compensation is the five highest consecutive years as a member, payable to a surviving spouse, the decedent's children or dependent parents. Accumulated member contributions are paid to the designated beneficiary. Children of deceased members receiving a special death benefit will continue to receive this benefit, prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. The annuity shall be reallocated among the remaining eligible children. Disabled children receiving a special death benefit may receive a special death benefit as long as they remain disabled, regardless of age.

Death Benefit for Vested Former Member

If a member is not active, but is eligible for a vested allowance, the member's designated beneficiary or estate is eligible to receive only accumulated member contributions at time of death.

8. Vested Allowance

NCPS, ECPS, and ACPS Eligibility: Five years of eligibility service and separation from employment other than by death or retirement.

NCPS, ECPS, and ACPS Allowance: Accrued retirement allowance payable at age 62. A member who has completed 15 years of eligibility service may begin to receive benefit payments at any time on or after attainment of age 55, reduced by 0.5% for each month that benefit commencement date precedes age 62 (maximum reduction of 42%).

If member dies before payment of the vested allowance starts, only accumulated member contributions are returned.

RCPB Eligibility: 10 years of eligibility service and separation from employment other than by death or retirement.

RCPB Allowance: Accrued retirement allowance payable at age 65 provided member does not withdraw accumulated contributions. A member who has completed 15 years of eligibility service may begin to receive benefit payments at any time on or after attainment of age 60, reduced by 0.5% for each month that benefit commencement date precedes age 65 (maximum reduction of 30%).

If member dies before payment of the vested allowance starts, only accumulated member contributions are returned.

9. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index (CPI). Generally, effective July 1, 1998, and for an allowance based on creditable service earned before July 1, 2011, the adjustment is capped at a maximum of 3% compounded and is applied to all allowances which have been in payment for one year.

Employees' Pension System of the State of Maryland

Generally, for an allowance based on creditable service earned on or after July 1, 2011, the COLA is capped at 2.5% if, for the calendar year ending December 31 in the previous fiscal year, the several systems' total investment performance was greater than or equal to the assumed rate of investment return established by the Board of Trustees and in effect as of December 31 of the preceding fiscal year. The adjustment is capped at 1% if, for the calendar year ending December 31 in the previous fiscal year the several systems' total investment performance was less than the assumed rate of investment return established by the Board of Trustees and in effect as of December 31 of the preceding fiscal year.

For certain individuals, such as employees of a participating governmental unit that has not elected the contributory pension benefit or the Alternate Contributory Pension Selection for its members, or their surviving beneficiaries, the allowance is subject to a simple COLA capped at 3%.

In years in which COLAs would be less than zero due to a decline in the CPI, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

10. Optional Forms of Payment

Basic service allowance is in a single life annuity.

- Option 1: Lump-sum refund equal to excess of present value of basic retirement allowance at date of retirement minus total amount of payments made to date of death excluding any cost of living adjustments for retirees before July 1, 2017.
- Option 2: 100% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 100% of the retiree's reduced allowance for the life of the designated beneficiary. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.
- Option 3: 50% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 50% of the retiree's reduced allowance for the life of the designated beneficiary.
- Option 4: Lump-sum refund equal to value of accumulated member contributions minus total portion of monthly payments attributed to member contributions made to date of death, excluding any cost of living adjustments for retirees before July 1, 2017.
- Option 5: 100% "pop-up" joint and survivor annuity, which pays the designated beneficiary 100% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.

Employees' Pension System of the State of Maryland

Option 6: 50% “pop-up” joint and survivor annuity, which pays the designated beneficiary 50% of the retiree’s reduced allowance after the retiree’s death or returns the retiree’s benefit to the unreduced basic allowance if beneficiary predeceases retiree.

Retirees who have selected Options 2, 3, 5, or 6 and change their designated beneficiary after they retire, will have their retirement allowance re-calculated to reflect the age of the new designated beneficiary. Retirees who elect to change their beneficiary under Options 2, 3, 5, and 6, may rescind their request to change their designated beneficiary before the second monthly allowance is paid. Retirees who rescind the change of beneficiary, will have their benefit payment amount for the next payment restored to the amount paid before the change in beneficiary was made.

Vested former members who are eligible to receive a vested allowance of less than \$50 a month may elect to receive a lump-sum payment equal to the present value in lieu of a monthly benefit.

11. Reduction for Benefits Payable Under Workers’ Compensation

Disability retirement allowances, excluding annuity reserves, are reduced for workers’ compensation benefits paid or payable after retirement from injury occurring during employment by the State if the workers’ compensation benefits are for the same injury for which disability retirement was granted and are paid or payable for the same period of time for which the retirement benefits are paid. Employees’ Pension System retirees receiving an accidental disability payment are subject to an offset if they are getting a workers’ compensation payment for the same injury or illness, subject to specified limits. Offsets do not include any calculation of cost-of-living benefits that are paid on the original benefit amount. Conversely, workers’ compensation payments are subject to an offset by the Workers’ Compensation Commission if a recipient is receiving an ordinary disability payment from the

Employees’ Pension System for the same injury or illness. Any offset taken for an accidental disability from the Employees’ Pension System will be adjusted if the retiree was originally awarded an ordinary disability retirement benefit that was later converted to an accidental disability benefit. The adjusted offset shall reflect any offset awarded to the retiree’s employer by the Workers’ Compensation Commission.

State Police Retirement System of the State of Maryland

1. Membership

Membership is a condition of employment for all officers of the Maryland State Police.

2. Member Contributions

Members are required to contribute 8% of earnable compensation.

Contributions earn interest at 4% per year, compounded annually, until retirement, withdrawal of the accumulated contributions, or the end of membership for former members who are not entitled to receive a vested allowance.

3. Normal Retirement Age

Normal retirement age is age 50.

4. Normal Service Retirement Allowance

Eligibility: For individuals who are members on or before June 30, 2011, 22 years of eligibility service or attainment of age 50. For individuals who become members on or after July 1, 2011, 25 years of eligibility service or attainment of age 50. Retirement at age 60 is mandatory for all but the Secretary of State Police.

Allowance: For individuals who are members on or before June 30, 2011, 2.55% of average final compensation for the three highest years as a member. For individuals who become members on or after July 1, 2011, 2.55% of average final compensation for the five highest years as a member. Maximum benefit is 71.4% of average final compensation.

5. Early Retirement Allowance

Not applicable to the State Police Retirement System.

6. Disability Retirement Allowance

Ordinary

Eligibility: Five years of eligibility service and certification of the medical board designated by the Board of Trustees that member is mentally or physically incapacitated from the performance of the normal duties of the member's position, and that incapacity is likely to be permanent.

Allowance: The allowance is the greater of a normal service retirement allowance (as described above) or 35% of the member's average final compensation.

State Police Retirement System of the State of Maryland

Special (Accidental)

Eligibility: Total and permanent incapacity for duty as certified by the medical board arising out of or in the course of the actual performance of duty without willful negligence by the member.

Allowance: For members who are under normal retirement age, the benefit is the lesser of either the member's average final compensation, or the sum of 66.67% of the member's average final compensation and an annuity that is actuarially equivalent to the member's accumulated contributions. Members who are at least normal retirement age are entitled either to the benefit as calculated for members under normal retirement age, or a normal service retirement allowance, whichever is greater.

7. Death Benefits

Normal Death Benefit – Return of Accumulated Contributions

Eligibility: Death while employed as a member and less than one year of eligibility service. A normal death benefit may be not paid if a special death benefit is paid for that death.

Benefit: Lump sum payment of member's accumulated member contributions to the member's designated beneficiary or, if there is no designated beneficiary, to the member's estate.

Normal Death Benefit – Return of Accumulated Contributions and Annual Earnable Compensation

Eligibility: Death while employed as a member and at least one year of eligibility service. A normal death benefit may not be paid if a special death benefit is paid for that death.

Benefit: Lump sum payment of member's accumulated contributions and an amount equal to the member's annual earnable compensation at the time of death to the member's designated beneficiary or, if there is no designated beneficiary, to the member's estate.

Special Death Benefit for Death While Employed and Not in Performance of Duty

Eligibility: Death while employed as a member, without member's willful negligence, and not in the performance of duty. Member has more than two years of eligibility service. The member is survived by a spouse, a child under the age of 26, a disabled child, or a dependent parent.

Benefit: Accumulated member contributions plus an allowance equal to 50% of the member's average final compensation.

Beneficiary: Payment of the member's accumulated member contributions shall be paid to the member's designated beneficiary, or otherwise to the member's estate. An allowance equal to 50% of the member's average final compensation shall be made to the surviving spouse; however, if there is no surviving spouse or spouse dies before youngest child reaches age 26, 50% of average final compensation continues prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. If the child is disabled, the benefit will continue as long as

State Police Retirement System of the State of Maryland

the child remains disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, payment is made to dependent parents. If none of the above conditions is met, the normal death benefit is paid to the designated beneficiary.

Special Death Benefit for Death in The Performance of Duty

Eligibility: Death while employed as a member, without member's willful negligence, and in the performance of duty. The member is survived by a spouse, a child under the age of 26, a disabled child, or a dependent parent.

Benefit: Accumulated member contributions plus an allowance equal to 66.67% of the member's average final compensation.

Beneficiary: Payment of the member's accumulated member contributions shall be paid to the member's designated beneficiary, or otherwise to the member's estate. An allowance equal to 66.67% of the member's average final compensation shall be made to the surviving spouse; however, if there is no surviving spouse or spouse dies before youngest child reaches age 26, 66.67% of average final compensation continues prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. If the child is disabled, the benefit will continue as long as the child remains disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, payment is made to dependent parents. If none of the above conditions is met, the normal death benefit is paid to the designated beneficiary.

Waiver of Special Death Benefit

Before the payment of any special death benefit is made under this section, if all individuals eligible for a special death benefit elect to waive the payment of the special death benefit, a normal death benefit is paid to the member's designated beneficiary, or otherwise to the member's estate.

Death Benefit for Vested Former Member

If a member is not active, but is eligible for a vested allowance, the member's designated beneficiary or estate is eligible to receive only accumulated member contributions at time of death.

8. Vested Allowance

Eligibility: For individuals who became members on or before June 30, 2011, five years of eligibility service and separation from employment other than by death or retirement. For individuals who become members on or after July 1, 2011, 10 years of eligibility service and separation from employment other than by death or retirement.

Allowance: Service retirement allowance payable at normal retirement age, provided the member does not withdraw the member's accumulated contributions.

State Police Retirement System of the State of Maryland

9. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index (CPI). Any COLAs are effective July 1, for all allowances which have been in payment for one year.

Uncapped compounded COLAs are applied to all benefits attributable to creditable service earned on or before June 30, 2011.

For an allowance based on creditable service earned on or after July 1, 2011, the COLA adjustment is capped at 2.5% if, for the calendar year ending December 31 in the previous fiscal year, the several systems' total investment performance was greater than or equal to the assumed rate of investment return established by the Board of Trustees and in effect as of December 31 of the preceding fiscal year. The adjustment is capped at 1% if, for the calendar year ending December 31 in the previous fiscal year, the several systems' total investment performance was less than the assumed rate of investment return established by the Board of Trustees and in effect as of December 31 of the preceding fiscal year.

In years in which COLAs would be less than zero due to a decline in the CPI, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

Retirees and beneficiaries receiving a retirement allowance on or before June 30, 1999, who receive an annual adjustment to their benefit ranging from \$1,200 to \$2,100 receive separate COLAs on this adjustment commencing effective July 1, 2000.

10. Optional Forms of Payment

If, at the time of death, the retiree is married, the retiree's spouse is entitled to receive a survivor benefit consisting of 80% of the retiree's retirement allowance. If there is no surviving spouse or upon the death of the surviving spouse, payment of the survivor benefit is divided equally among any children of the deceased retiree under the age of 18 years, until each child dies or becomes age 18. If the child is disabled, the benefit will continue as long as the child remains disabled, regardless of age. If there is no spouse at time of retirement, member may select an optional allowance.

Option 1: Lump-sum refund equal to excess of present value of basic retirement allowance at date of retirement minus total amount of payments made to date of death excluding any cost of living adjustments for retirees before July 1, 2017.

Option 2: 100% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 100% of the retiree's reduced allowance for the life of the designated beneficiary. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.

Option 3: 50% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 50% of the retiree's reduced allowance for the life of the designated beneficiary.

State Police Retirement System of the State of Maryland

- Option 4: Lump-sum refund equal to value of accumulated member contributions minus total portion of monthly payments attributed to member contributions made to date of death, excluding any cost of living adjustments for retirees before July 1, 2017.
- Option 5: 100% “pop-up” joint and survivor annuity, which pays the designated beneficiary 100% of the retiree’s reduced allowance after the retiree’s death or returns the retiree’s benefit to the unreduced basic allowance if beneficiary predeceases retiree. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree’s spouse or disabled child.
- Option 6: 50% “pop-up” joint and survivor annuity, which pays the designated beneficiary 50% of the retiree’s reduced allowance after the retiree’s death or returns the retiree’s benefit to the unreduced basic allowance if beneficiary predeceases retiree.

Retirees who have selected Options 2, 3, 5, or 6 and change their designated beneficiary after they retire, will have their retirement allowance re-calculated to reflect the age of the new designated beneficiary. Retirees who elect to change their beneficiary under Options 2, 3, 5, and 6, may rescind their request to change their designated beneficiary before the second monthly allowance is paid. Retirees who rescind the change of beneficiary, will have their benefit payment amount for the next payment restored to the amount paid before the change in beneficiary was made.

11. Reduction for Benefits Payable Under Workers’ Compensation

Disability retirement allowances, excluding annuity reserves, are reduced for workers’ compensation benefits paid or payable after retirement from injury occurring during employment by the State if the workers’ compensation benefits are for the same injury for which disability retirement was granted and are paid or payable for the same period of time for which the retirement benefits are paid. State Police Retirement System retirees receiving an accidental disability payment are subject to an offset if they are getting a workers’ compensation payment for the same injury or illness, subject to specified limits. Offsets do not include any calculation of cost-of-living benefits that are paid on the original benefit amount. Conversely, workers’ compensation payments are subject to an offset by the Workers’ Compensation Commission if a recipient is receiving an ordinary disability payment from the State Police Retirement System for the same injury or illness. Any offset taken for an accidental disability from the State Police Retirement System will be adjusted if the retiree was originally awarded an ordinary disability retirement benefit that was later converted to an accidental disability benefit. The adjusted offset shall reflect any offset awarded to the retiree’s employer by the Workers’ Compensation Commission.

12. Deferred Retirement Option Program (DROP)

Eligibility: Members who joined the State Police Retirement System on or before June 30, 2011 are eligible to participate in the DROP if they are less than 60 years old and have at least 22 but less than 30 years of eligibility service. Members who join the State Police System on or after July 1, 2011 are eligible to participate in the DROP if they are less than 60 years old and have at least 25 but less than 30 years of eligibility service.

State Police Retirement System of the State of Maryland

Participation: An eligible member may participate in the DROP for the lesser of 5 years, the difference between 30 years and the member's creditable service, the difference between 60 years and the member's age on date of election to participate, or a term selected by the member. Participation also ends if the participant dies, is terminated from employment, accepts a special disability retirement allowance, or submits a binding letter of resignation or notice of intent to terminate employment. Members who participate in the DROP are retired and cease making member contributions, and cease accruing service credit and additional benefits.

Allowance: For members who entered the DROP on or before June 30, 2011, the service retirement allowance, with COLAs, is credited to an account earning interest at the rate of 6% per year, compounded monthly. For members who enter DROP on or after July 1, 2011, the service retirement allowance, with COLAs, is credited to an account earning interest at the rate of 4% per year, compounded annually. When the DROP period ends, members terminate employment and begin receiving their monthly allowance plus the lump sum payment from their DROP account. During the DROP period, members remain eligible for Special Disability benefits if incapacitated while in DROP.

Judges' Retirement System of the State of Maryland

1. Membership

Membership is a condition of employment for a judge of the Court of Appeals, Court of Special Appeals, Circuit Court, or District Court of Maryland and members of the State Workers' Compensation Commission. Membership ends if the member is separated from employment for more than four years, withdraws the member's accumulated contributions, retires, or dies.

2. Member Contributions

Members are required to make contributions of 8% of salary until they have completed 16 years of service as a member.

Contributions earn interest at 4% per year, compounded annually, until retirement or withdrawal of accumulated contributions. Non-vested members who became members of the Judges' Retirement System on or after July 1, 2012 shall not receive interest after membership ends.

3. Normal Retirement Age

Normal retirement age is age 60.

4. Retirement Allowance

Eligibility: An individual who is a member of the Judges' Retirement System before July 1, 2012 is entitled to a retirement allowance: (1) on termination of service if the member is at least age 60; (2) on resignation for disability and recommendation of the medical board, (3) when retired by order of the Court of Appeals, or (4) at the age of 60 years. An individual who becomes a member of the Judges' Retirement System on or after July 1, 2012 is entitled to a retirement allowance: (1) on termination of service if the member is at least 60 and has at least 5 years of eligibility service; (2) on resignation for disability and recommendation of the medical board, (3) when retired by order of the Court of Appeals if the member has at least 5 years of eligibility service; (4) at the mandatory retirement age required by the Maryland Constitution with less than five years of service, if the member has eligibility service equal to the mandatory retirement age minus the member's age when the member joined the Judges' Retirement System; or (5) at the age of 60, if the former member's termination of service occurred earlier and the former member had at least five years of eligibility service when the former member terminated service.

Allowance: Generally, the retirement allowance equals 66.67% of salary payable in that fiscal year to member holding same level of judicial position that retiree held on termination of service. For members with less than 16 years of service credit, the benefit is reduced based on the ratio of years of service credit to 16.

5. Early Retirement Allowance

Not applicable to the Judges' Retirement System.

Judges' Retirement System of the State of Maryland

6. Disability Retirement Allowance

Eligibility: Certification of the medical board designated by the Board of Trustees that member is incapacitated for the performance of duty, and that incapacity is likely to be permanent.

Allowance: A retirement allowance payable immediately. However, if a judge has at least three years of service credit as a member, the allowance will be at least .333% of the judge's salary at the time of retirement.

7. Death Benefits

Monthly Allowance

Eligibility: Death of a judge or former judge at any age, leaving a surviving spouse or children under the age of 26, or a child who is disabled, regardless of age.

Allowance: 50% of the pension that would have been payable to the judge or former judge as of the date of death, as if the judge or former judge was eligible to receive a retirement allowance, is payable to surviving spouse. If there is no spouse, payment is divided equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. If the child is disabled, the benefit will continue as long as the child remains disabled, regardless of age.

Lump Sum

On death of a member who is not survived by a spouse or children, the Board of Trustees shall pay the member's accumulated contributions and an amount equal to the member's annual salary at time of death to the member's designated beneficiary. If the member has designated more than one beneficiary, this lump-sum death benefit shall be divided equally among the beneficiaries. If a member's service is terminated by death and the member leaves no spouse, child under the age of 18 years, or designated beneficiary, the member's accumulated contributions shall be paid to the member's estate.

8. Vested Allowance

Eligibility: Individuals who became members before July 1, 2012, are eligible once they have both separated from service and reached age 60 years. Individuals who become members on or after July 1, 2012, are eligible once they have separated from service, reached age 60 years, and earned five years of eligibility service. Also eligible are individuals who became members on or after July 1, 2012 who are required to retire due to mandatory retirement and have less than 5 years of service at that time, if they have an amount of eligibility service equal to constitutional mandatory retirement age minus the member's age when the individuals first become members of the System.

Allowance: Same as allowance payable at age 60.

Judges' Retirement System of the State of Maryland

In lieu of a deferred vested allowance pension, a former judge may elect to withdraw accumulated contributions following the judge's termination of service.

9. Cost-of-Living Adjustments (COLA)

Generally, allowances are recalculated each time the salary for a sitting judge from the Court from which the judge retired increases.

NOTE: Magistrates who retire from the Judges' Retirement System receive COLA allowances equal to the percentage increase in salary provided to judges of the Circuit Court.

10. Optional Forms of Payment

For survivor allowance payable to a member's surviving spouse, children under age 26, or disabled children, see Death Benefits section above. A judge or former judge, who at the time of retirement, does not have a spouse or child under the age of 18 years, may elect one of the following optional forms of payment:

- Option 1: Lump-sum equal to excess of present value of basic retirement allowance at date of retirement minus total amount of payments made to date of death excluding any cost of living adjustments for retirees before July 1, 2017.
- Option 2: 100% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 100% of the retiree's reduced allowance for the life of the designated beneficiary. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.
- Option 3: 50% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 50% of the retiree's reduced allowance for the life of the designated beneficiary.
- Option 4: Lump-sum equal to value of accumulated member contributions minus total portion of monthly payments attributed to member contributions made to date of death, excluding any cost of living adjustments for retirees before July 1, 2017.
- Option 5: 100% "pop-up" joint and survivor annuity, which pays the designated beneficiary 100% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.
- Option 6: 50% "pop-up" joint and survivor annuity, which pays the designated beneficiary 50% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree.

A retiree who has elected one of these optional forms of allowance may not change the designated beneficiary.

Law Enforcement Officers' Pension System of the State of Maryland

A. Pension Provisions

1. Membership

Membership generally is a condition of employment for all law enforcement officers who are employees of the State as provided in SPP § 26-201, or whose employers are participating governmental units who elect to have their law enforcement officers or firefighters/paramedics participate in the Law Enforcement Officers' Pension System.

2. Member Contributions

Members are required to contribute 7% of earnable compensation.

Contributions earn interest at 5% per year, compounded annually, until retirement, withdrawal of accumulated contributions, death, or the end of membership for former members who are not entitled to receive a vested allowance.

3. Normal Retirement Age

Normal retirement age is age 50.

4. Normal Service Retirement Allowance

Eligibility: 25 years of eligibility service or attainment of age 50.

Allowance: For individuals who became members on or before June 30, 2011, 2.0% of average final compensation for the three highest consecutive years as a member. For individuals who became members on or after July 1, 2011, 2.0% of average compensation for the five highest consecutive years as a member. For members who retired before July 1, 2018, the maximum benefit was 60% of average final compensation. For members who retire on or after July 1, 2018, the maximum benefit is 65% of average final compensation.

5. Early Retirement Allowance

Not applicable to the Law Enforcement Officers' Retirement System.

6. Disability Retirement Allowance

Ordinary

Eligibility: Five years of eligibility service and certification of the medical board designated by the Board of Trustees that member is incapacitated for the performance of duty, and that incapacity is likely to be permanent.

Law Enforcement Officers Pension System of the State of Maryland

Allowance: Service retirement allowance computed on the basis that service continues until age 50 without any change in rate of earnable compensation. If disability occurs after age 50, the benefit is based on creditable service at time of retirement.

Accidental

Eligibility: Total and permanent incapacity for duty as certified by the medical board arising out of or in the course of the actual performance of duty, without willful negligence.

Allowance: The benefit is 66.7% of average final compensation plus an annuity provided by accumulated member contributions. The maximum benefit cannot be greater than the average final compensation.

7. Death Benefits

Normal Death Benefit – Return of Accumulated Contributions

Eligibility: Death while employed as a member and less than one year of eligibility service. A normal death benefit may not be paid if a special death benefit is paid for that death.

Benefit: Lump sum payment of member's accumulated member contributions to the member's designated beneficiary or, if there is no designated beneficiary, to the member's estate.

Normal Death Benefit – Return of Accumulated Contributions and Annual Earnable Compensation

Eligibility: Death while employed as a member and at least one year of eligibility service. A normal death benefit may not be paid if a special death benefit is paid for that death.

Benefit: Lump sum payment of member's accumulated member contributions and an amount equal to the member's annual earnable compensation at the time of death to the member's designated beneficiary or, if there is no designated beneficiary, to the member's estate.

Special Death Benefit for Death While Employed and Not in Performance of Duty

Eligibility: Death while employed as a member, without the member's willful negligence, and not in the performance of duty. The member is survived by a spouse, a child under the age of 26, a disabled child, or a dependent parent.

Benefit: Accumulated member contributions plus an allowance equal to 50% of the ordinary disability allowance the member would have received at the time of the member's death.

Law Enforcement Officers Pension System of the State of Maryland

Beneficiary: Payment of the member's accumulated member contributions shall be paid to the member's designated beneficiary, or otherwise to the member's estate. An allowance equal to 50% of the ordinary disability allowance the member would have received at the time of the member's death shall be made to the surviving spouse; however, if there is no surviving spouse or spouse dies before youngest child reaches age 26, 50% of average final compensation continues prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. If the child is disabled, the benefit will continue as long as the child remains disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, payment is made to dependent parents. If none of the above conditions is met, the normal death benefit is paid to the designated beneficiary.

Special Death Benefit for Death in The Performance of Duty

Eligibility: Death while employed as a member, without the member's willful negligence, and not in the performance of duty. The member is survived by a spouse, a child under the age of 26, a disabled child, or a dependent parent.

Benefit: Accumulated member contributions plus an allowance equal to 66.67% of the member's average final compensation.

Beneficiary: Payment of the member's accumulated member contributions shall be paid to the member's designated beneficiary, or otherwise to the member's estate. An allowance equal to 66.67% of the member's average final compensation be made to the surviving spouse; however, if there is no surviving spouse or spouse dies before youngest child reaches age 26, 66.67% of average final compensation continues prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. If the child is disabled, the benefit will continue as long as the child remains disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, payment is made to dependent parents. If none of the above conditions is met, the normal death benefit is paid to the designated beneficiary.

Waiver of Special Death Benefit

Before the payment of any special death benefit is made under this section, if all individuals eligible for a special death benefit elect to waive the payment of the special death benefit, a normal death benefit is paid to the member's designated beneficiary, or otherwise to the member's estate.

Death Benefit for Vested Former Member

If a member is not active, but is eligible for a vested allowance, the member's designated beneficiary or estate is eligible to receive only accumulated member contributions at time of death.

Law Enforcement Officers Pension System of the State of Maryland

8. Vested Allowance

Eligibility: For individuals who are members on or before June 30, 2011, five years of eligibility service. For individuals who become members on or after July 1, 2011, 10 years of eligibility service.

Allowance: Accrued retirement allowance payable at age 50 if the member does not withdraw the member's accumulated member contributions.

9. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index (CPI). Any COLAs are effective July 1, for allowances which have been in payment for one year. Effective July 1, 2000, for an allowance based on creditable service earned before July 1, 2011, the adjustment is capped at a maximum 3% compounded and is applied to all allowances which have been in payment for one year.

For an allowance based on creditable service earned on or after July 1, 2011, the COLA adjustment is capped at 2.5% if, for the calendar year ending December 31 in the previous fiscal year, the several systems' total investment performance was greater than or equal to the assumed rate of investment return established by the Board of Trustees and in effect as of December 31 of the preceding fiscal year. The adjustment is capped at 1% if, for the calendar year ending December 31 in the previous fiscal year, the several systems' total investment performance was less than the assumed rate of investment return established by the Board of Trustees and in effect as of December 31 of the preceding fiscal year.

In years in which COLAs would be less than zero due to a decline in the CPI, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

10. Optional Forms of Payment

If, at the time of death, the retiree is married, the retiree's spouse is entitled to receive a survivor benefit consisting of 50% of the retiree's basic allowance. If there is no surviving spouse or upon the death of the surviving spouse, payment of the survivor benefit is divided equally among any children of the deceased retiree under the age of 26 years, until each child dies or becomes age 26. If the child is disabled, the benefit will continue as long as the child remains disabled, regardless of age. If there is no spouse at time of retirement, member may select an optional allowance.

Option 1: Lump-sum refund equal to excess of present value of basic retirement allowance at date of retirement minus total amount of payments made to date of death excluding any cost of living adjustments for retirees before July 1, 2017.

Law Enforcement Officers Pension System of the State of Maryland

- Option 2: 100% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 100% of the retiree's reduced allowance for the life of the designated beneficiary. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.
- Option 3: 50% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 50% of the retiree's reduced allowance for the life of the designated beneficiary.
- Option 4: Lump-sum refund equal to value of accumulated member contributions minus total portion of monthly payments attributed to member contributions made to date of death, excluding any cost of living adjustments for retirees before July 1, 2017.
- Option 5: 100% "pop-up" joint and survivor annuity, which pays the designated beneficiary 100% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.
- Option 6: 50% "pop-up" joint and survivor annuity, which pays the designated beneficiary 50% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree.

Retirees who have selected Options 2, 3, 5, or 6 and change their designated beneficiary after they retire, will have their retirement allowance re-calculated to reflect the age of the new designated beneficiary. Retirees who elect to change their beneficiary under Options 2, 3, 5, and 6, may rescind their request to change their designated beneficiary before the second monthly allowance is paid. Retirees who rescind the change of beneficiary, will have their benefit payment amount for the next payment restored to the amount paid before the change in beneficiary was made.

11. Reduction for Benefits Payable under Workers' Compensation

Disability retirement allowances, excluding annuity reserves, are reduced for workers' compensation benefits paid or payable after retirement from injury occurring during employment by the State if the workers' compensation benefits are for the same injury for which disability retirement was granted and are paid or payable for the same period of time for which the retirement benefits are paid. Law Enforcement Officers' Pension System retirees receiving an accidental disability payment are subject to an offset if they are getting a workers' compensation payment for the same injury or illness, subject to specified limits. Offsets do not include any calculation of cost-of-living benefits that are paid on the original benefit amount. Conversely, workers' compensation payments are subject to an offset by the Workers' Compensation Commission if a recipient is receiving an ordinary disability payment from the Law Enforcement Officers' Pension System for the same injury or illness. Any offset taken for an accidental disability

Law Enforcement Officers Pension System of the State of Maryland

from the Law Enforcement Officers' Pension System will be adjusted if the retiree was originally awarded an ordinary disability retirement benefit that was later converted to an accidental disability benefit. The adjusted offset shall reflect any offset awarded to the retiree's employer by the Workers' Compensation Commission.

12. Deferred Retirement Option Plan (DROP)

Eligibility: Members are eligible to participate in the DROP if they have at least 25 and less than 30 years of creditable service.

Participation: An eligible member may participate in the DROP for the lesser of 5 years, the difference between 30 years and the member's creditable service, or a term selected by the member. Participation also ends if the participant dies, is terminated from employment, accepts an accidental disability retirement allowance, or submits a binding letter of resignation or notice of intent to terminate employment. Members who participate in the DROP are retired and cease making member contributions, and cease accruing service credit and additional benefits.

Allowance: For members who entered the DROP on or before June 30, 2011, the service retirement allowance, with annual COLAs, is credited to an account earning interest at the rate of 6% per year, compounded monthly. For members who enter DROP on or after July 1, 2011, the service retirement allowance, with annual COLAs, is credited to an account earning interest at the rate of 4% per year, compounded annually. When the DROP period ends, members terminate employment and begin receiving their monthly allowance plus the lump sum payment from their DROP account. During the DROP period, members remain eligible for accidental disability benefits if incapacitated while in DROP.

B. Members Transferring from the Employees' Retirement System¹

1. Membership

The retirement tier was closed to new participants effective January 1, 2005.

2. Member Contributions

Members who transferred from Employees' Retirement System (Plan A) are required to contribute 7% of earnable compensation. Members who transferred from the Employees' Retirement System (Plan B) contribute 5% of earnable compensation.

¹ This Section B outlines the provisions applicable to members of LEOPS who transferred from the Employees' Retirement System before January 1, 2005 and were subject to Selection A or Selection B and did not elect to participate in the contributory law enforcement officers' modified benefit.

Law Enforcement Officers' Pension System of the State of Maryland

Contributions earn interest at 4% per year, compounded annually, until retirement, withdrawal of accumulated contributions, death, or the end of membership for former members who are not entitled to receive a vested allowance.

3. Normal Retirement Age

Normal retirement age is age 50.

4. Normal Service Retirement Allowance

Eligibility: 25 years of eligibility service or attainment of age 50.

Allowance: 2.3% of average final compensation for the three highest years as a member for each of the first 30 years of creditable service, plus 1.0% of average final compensation for each additional year.

5. Early Retirement Allowance

Not applicable to this System.

6. Disability Retirement Allowance

Ordinary

Eligibility: Five years of eligibility service and certification of the medical board designated by the Board of Trustees that member is incapacitated for the performance of duty, and that incapacity is likely to be permanent.

Allowance: The greater of normal service retirement allowance or 25% of average final compensation.

Accidental

Eligibility: Total and permanent incapacity for duty as certified by the medical board arising out of or in the course of the actual performance of duty, without willful negligence.

Allowance: The benefit is 66.7% of average final compensation plus an annuity that is the actuarial equivalent of accumulated contributions. The maximum benefit cannot be greater than the average final compensation.

Law Enforcement Officers' Pension System of the State of Maryland

7. Death Benefits

Normal Death Benefit – Return of Accumulated Contributions

Eligibility: Death while employed as a member and less than one year of eligibility service. A normal death benefit may not be paid if a special death benefit is paid for that death.

Benefit: Lump sum payment of member's accumulated member contributions to the member's designated beneficiary or, if there is no designated beneficiary, to the member's estate.

Normal Death Benefit – Return of Accumulated Contributions and Annual Earnable Compensation

Eligibility: Death while employed as a member and at least one year of eligibility service. A normal death benefit may not be paid if a special death benefit is paid for that death.

Benefit: Lump sum payment of member's accumulated member contributions and an amount equal to the member's annual earnable compensation at the time of death to the member's designated beneficiary or, if there is no designated beneficiary, to the member's estate.

Special Death Benefit for Death While Employed and Not in Performance of Duty

Eligibility: Death while employed as a member, without the member's willful negligence, and not in the performance of duty. The member is survived by a spouse, a child under the age of 26, a disabled child, or a dependent parent.

Benefit: Accumulated member contributions plus an allowance equal to 50% of the ordinary disability allowance the member would have received at the time of the member's death.

Beneficiary: Payment of the member's accumulated member contributions shall be paid to the member's designated beneficiary, or otherwise to the member's estate. An allowance equal to 50% of the ordinary disability allowance the member would have received at the time of the member's death shall be made to the surviving spouse; however, if there is no surviving spouse or spouse dies before youngest child reaches age 26, 50% of average final compensation continues prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. If the child is disabled, the benefit will continue as long as the child remains disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, payment is made to dependent parents. If none of the above conditions is met, the normal death benefit is paid to the designated beneficiary.

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Special Death Benefit for Death in The Performance of Duty

Eligibility: Death while employed as a member, without the member's willful negligence, and not in the performance of duty. The member is survived by a spouse, a child under the age of 26, a disabled child, or a dependent parent.

Benefit: Accumulated member contributions paid plus an allowance equal to 66.67% of the member's average final compensation.

Beneficiary: Payment of the member's accumulated member contributions shall be paid to the member's designated beneficiary, or otherwise to the member's estate. An allowance equal to 66.67% of the member's average final compensation be made to the surviving spouse; however, if there is no surviving spouse or spouse dies before youngest child reaches age 26, 66.67% of average final compensation continues prorated equally among the eligible children. A child is eligible for a prorated share of the annuity until reaching age 26. If the child is disabled, the benefit will continue as long as the child remains disabled, regardless of age. In cases where a deceased member is not survived by a spouse or children, payment is made to dependent parents. If none of the above conditions is met, the normal death benefit is paid to the designated beneficiary.

Waiver of Special Death Benefit

Before the payment of any special death benefit is made under this section, if all individuals eligible for a special death benefit elect to waive the payment of the special death benefit, a normal death benefit is paid to the member's designated beneficiary, or otherwise to the member's estate.

Death Benefit for Vested Former Member

If a member is not active, but is eligible for a vested allowance, the member's designated beneficiary or estate is eligible to receive only accumulated member contributions at time of death.

8. Vested Allowance

Eligibility: Five years of eligibility service and separation from employment other than by death or retirement.

Allowance: Service retirement allowance payable at normal retirement age if the member does not withdraw the member's accumulated member contributions.

Law Enforcement Officers' Pension System of the State of Maryland

9. Cost-of-Living Adjustments (COLA)

Retirement allowances may be adjusted each year based on the Consumer Price Index (CPI). Any COLAs are effective July 1, for all allowances which have been in payment for one year.

For an allowance for members that elected Selection A (contributing 7% of earnable compensation), uncapped COLA is compounded annually. For an allowance for members that elected Selection B (contributing 5% of earnable compensation), the COLA is capped at a maximum 5% compounded annually.

In years in which COLAs would be less than zero due to a decline in the CPI, retirement allowances will not be adjusted. COLAs in succeeding years are adjusted until the difference between the negative COLA that would have applied and the zero COLA is fully recovered.

10. Optional Forms of Payment

If, at the time of death, the retiree is married, the retiree's spouse is entitled to receive a survivor benefit consisting of 50% of the retiree's basic allowance. If there is no surviving spouse or upon the death of the surviving spouse, payment of the survivor benefit is divided equally among any children of the deceased retiree under the age of 26 years, until each child dies or becomes age 26. If the child is disabled, the benefit will continue as long as the child remains disabled, regardless of age. If there is no spouse at time of retirement, member may select an optional allowance.

- Option 1: Lump-sum refund equal to excess of present value of basic retirement allowance at date of retirement minus total amount of payments made to date of death excluding any cost of living adjustments for retirees before July 1, 2017.
- Option 2: 100% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 100% of the retiree's reduced allowance for the life of the designated beneficiary. The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.
- Option 3: 50% joint and survivor annuity, which pays the retiree's surviving designated beneficiary 50% of the retiree's reduced allowance for the life of the designated beneficiary.
- Option 4: Lump-sum refund equal to value of accumulated member contributions minus total portion of monthly payments attributed to member contributions made to date of death, excluding any cost of living adjustments for retirees before July 1, 2017.
- Option 5: 100% "pop-up" joint and survivor annuity, which pays the designated beneficiary 100% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree.

Law Enforcement Officers Pension System of the State of Maryland

The designated beneficiary cannot be more than 10 years younger than the retiree unless the beneficiary is the retiree's spouse or disabled child.

Option 6: 50% "pop-up" joint and survivor annuity, which pays the designated beneficiary 50% of the retiree's reduced allowance after the retiree's death or returns the retiree's benefit to the unreduced basic allowance if beneficiary predeceases retiree.

Retirees who have selected Options 2, 3, 5, or 6 and change their designated beneficiary after they retire, will have their retirement allowance re-calculated to reflect the age of the new designated beneficiary. Retirees who elect to change their beneficiary under Options 2, 3, 5, and 6, may rescind their request to change their designated beneficiary before the second monthly allowance is paid. Retirees who rescind the change of beneficiary, will have their benefit payment amount for the next payment restored to the amount paid before the change in beneficiary was made.

11. Reduction for Benefits Payable under Workers' Compensation

Disability retirement allowances, excluding annuity reserves, are reduced for workers' compensation benefits paid or payable after retirement from injury occurring during employment by the State if the workers' compensation benefits are for the same injury for which disability retirement was granted and are paid or payable for the same period of time for which the retirement benefits are paid. Law Enforcement Officers' Pension System retirees receiving an accidental disability payment are subject to an offset if they are getting a workers' compensation payment for the same injury or illness, subject to specified limits. Offsets do not include any calculation of cost-of-living benefits that are paid on the original benefit amount. Conversely, workers' compensation payments are subject to an offset by the Workers' Compensation Commission if a recipient is receiving an ordinary disability payment from the Law Enforcement Officers' Pension System for the same injury or illness. Any offset taken for an accidental disability from the Law Enforcement Officers' Pension System will be adjusted if the retiree was originally awarded an ordinary disability retirement benefit that was later converted to an accidental disability benefit. The adjusted offset shall reflect any offset awarded to the retiree's employer by the Workers' Compensation Commission.

12. Deferred Retirement Option Program (DROP)

Eligibility: Members are eligible to participate in the DROP if they have at least 25 and less than 30 years of creditable service.

Participation: An eligible member may participate in the DROP for the lesser of 5 years, the difference between 30 years and the member's creditable service, or a term selected by the member. Participation also ends if the participant dies, is terminated from employment, accepts an accidental disability retirement allowance, or submits a binding letter of resignation or notice of intent to terminate employment. Members who participate in the DROP are retired and cease making member contributions, and cease accruing service credit and additional benefits.

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Allowance: For members who entered the DROP on or before June 30, 2011, the service retirement allowance, with annual COLAs, is credited to an account earning interest at the rate of 6% per year, compounded monthly. For members who enter DROP on or after July 1, 2011, the service retirement allowance, with annual COLAs, is credited to an account earning interest at the rate of 4% per year, compounded annually. When the DROP period ends, members terminate employment and begin receiving their monthly allowance plus the lump sum payment from their DROP account. During the DROP period, members remain eligible for Accidental Disability benefits if incapacitated while in DROP.